

DÆDALUS



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Foreword

In the year that has passed since the sale of 28 Newbury Street, the American Academy of Arts and Sciences has enjoyed a variety of meeting places that recalls its peripatetic habits of the eighteenth and early nineteenth centuries. For sixty years after its foundation in 1780 the Academy convened quarterly, with a reasonable pattern of summer and autumn meetings at Harvard College and winter and spring meetings at a variety of places in Boston. The "Philosophy Chamber in the University of Cambridge," which was designated in the Charter of Incorporation as the place of the first meeting, alternated with the County Court House in Boston until 1783 when the General Court granted the Academy the use of a room in the Manufactory House on the corner of Tremont Street and the present Hamilton Place. This building, which had been built by the Province to encourage spinning and kindred occupations, and was later occupied by the Massachusetts Bank, did not seem to give complete satisfaction, for by 1796 the Academy was hankering for a room in the newly completed State House. It took until 1800 to achieve this end, and in 1811 the Governor notified the Academy that their room was needed by the Legislature.

After a few years of lodging with the Boston Marine Insurance Company, the Academy in 1817 settled in with the Boston Athenæum, then in a house in Tremont Street overlooking the King's Chapel Burying Ground. Five years later when the Athenæum moved to new quarters in Pearl Street, the Academy went along. In 1829, as the new Athenæum building was becoming overcrowded, the Academy moved to the 50 State Street premises of the Massachusetts Hospital Life Insurance Company, whose Actuary, Nathaniel Bowditch, had recently become President of the Academy in succession to John Quincy Adams.

After a dozen years in State Street, a further move was made to 7½ Tremont Row, in the part of Scollay Square now consecrated to tattooing parlors. The Boston Athenæum had, in the meantime, so far outgrown its quarters in Pearl Street that Edward C. Cabot's plans for the present building were approved in April 1846. The cornerstone was laid a year later and the building occupied in July

1849, although the interior was not completely finished. The Athenæum's dignified new premises attracted the Academy in more ways than one, for in 1851 a committee was considering "the expediency of electing as Associate Members of the Academy gentlemen not known as scientific men, strictly so called, but interested in literary and scientific subjects." Samuel Atkins Eliot, in urging the inexpediency of electing such members, reported the committee's opinion "that this class of persons would be found among the proprietors of the Athenæum, and also that by removing from the rooms now occupied by the Academy to the very eligible apartment in the Athenæum which the proprietors are desirous of leasing, and granting to such of these gentlemen as might desire it, the privilege of attending the meetings of the Academy, much good would be effected to both parties." The first floor front room to the left of the Athenæum entrance proved so attractive that the Academy leased it and remained there for forty-seven years — the longest that this peripatetic society has remained quietly in one building. The first meeting to be held there was on 24 February 1852; in the succeeding decades this room — crowded with books and busts — was often placed at the disposal of the American Antiquarian Society, the Colonial Society of Massachusetts, and other learned societies.

Libraries perennially burst their seams. The new Athenæum that had seemed so commodious in 1852 was bulging by 1899. The Massachusetts Historical Society, which had in 1872 lodged temporarily with the Academy in the Athenæum while pulling down one building and putting up a new one at 30 Tremont Street, was, a quarter of a century later, moving to new and handsome but highly unfunctional premises at the corner of Boylston Street and the Fenway. To the third floor of this yellow brick edifice, which made up in marble halls and superbly panelled rooms for what it lacked in book stacks, the Academy moved in the autumn of 1899. By 1903 space was becoming short even there, and, after deciding against leasing rooms from the Boston Library Society at 114 Newbury Street, the Academy bought in 1904 property of its own at 28 Newbury Street. The original dwelling house, built in 1870, served until 1911 when it was demolished to make way for a new building generously provided by the Agassiz family. In the interval between the abandonment, on 25 March 1911, of the old house and the first meeting in the new on 8 May 1912, the Academy once again met in the Massachusetts Historical Society. Forty-three years later, when business was en-

gulfing the neighborhood and M.I.T. — once a near neighbor — had long since retreated to Cambridge, 28 Newbury Street was sold.

Anyone who leafs through the record books or the *Proceedings* of the Academy will see that there is no novelty to the subjects that are burningly debated today. Where to lodge, whom to elect and how to improve attendance at meetings have occupied the Fellows from the beginning. In the eighteen forties experiments with more frequent meetings of new types were under discussion. Then as now, committees considered and argued endlessly, but by October 1845 a plan for "social meetings" at Fellows' houses on the months before the stated quarterly meetings was inaugurated. These new gatherings opened with "conversation and verbal communications" from seven to eight, followed by an hour of written reports. At nine o'clock the scene changed to "entertainment of a different kind, but it is hoped of a simple character." It is diverting to note that Professor William W. Goodwin (President, 1903-1908) recalled at the 1910 celebration of the one thousandth meeting of the Academy that in the eighteen fifties "a controversy arose between some of its members who felt that the increasing interest taken in the social meetings in private houses interfered with the more important scientific duties of the Academy as a learned society, and those who (like Professor Felton) 'could see no harm in a glass of wine and an oyster.'" Although plenty of old-time arguments continue with undiminished fervor after one hundred and seventy-six years, that one at least has been happily resolved. If the Academy of the nineteen fifties contains any determined enemies of a glass of wine and an oyster they are either cowed into silence by force of superior numbers or courteously hold their peace like tolerant scholars and gentlemen.

WALTER MUIR WHITEHILL
EDITOR

A Farewell to the Academy House on Newbury Street

*Remarks at the One Thousand Three Hundred
and Eighty-Second Meeting of the Academy
on 13 April 1955*

HARLOW SHAPLEY

MR. PRESIDENT, Academicians, Guests: We shall in a few minutes rise and leave this meeting hall forever. It is a moment of sentiment. For more than four decades we have met in this room, in this building — a home provided chiefly by the generosity of the Agassiz family. Tonight I look around this room and the other rooms of our Academy House with a natural feeling of wistful sadness. It would be pleasant to look forward to returning from time to time.

I presided here for a number of years, and I have worked, even slaved, on various committees. Others of you have done as much or more in the interest of what our Academy does and represents. Dr. E. B. Wilson, who has worked so much for the Academy, was the president twenty-eight years ago, and loyally he is here tonight for this last meeting (except, as it happens, at this moment he is upstairs fortifying himself with a drink).

Many inspiring sessions have been held here, as tonight. I remember the time that the Dewey-Almy Company put on the program. They filled the end of this hall from floor to ceiling with various colored balloons, and at the conclusion of the evening we irreverently punctured them with pins (that is, the balloons). But in general full and genial dignity prevails.

I remember the time when Albert Einstein addressed the Academy. He was introduced in German, or near German, by President George Foot Moore. The theory of relativity — its equations — amazed us, of course, but Mr. Einstein was amazed, or at least he looked amazed, when his equations would disappear from the blackboard immediately his back was turned. For Professor Julian Coolidge, in a helpful mood, would jump up and erase an equation when it had

been once used. Here we believe, apparently, in fresh equations.

Mrs. George R. Agassiz was interested in our open meetings which formerly came but once a year and were attended by the women folk; but Mrs. Agassiz regretted the pallid punch that we served. She endowed the punch, thus providing that our refreshments could be suitably inspirited. The open meetings promptly grew.

In saying good-by to the Academy House, I should like to take this opportunity to state what seem to me to be the principal functions of this ancient Academy. As I see it, the Academy has four principal programs:

- 1) the recognition and honoring of merit. This is done by election to membership, ordinary and honorary, and through the bestowal of honorary awards, namely, the Rumford Medals and the Amory Prizes, both in the fields of science.

- 2) The making of grants of money in support of research by the Rumford Fund Committee, the Warren Fund Committee, and the committee in charge of disbursements from the important Permanent Science Fund — these again all in the fields of science.

- 3) Our publications — the Proceedings of the Academy, and especially the quarterly called *Dædalus* which we are soon to undertake.

- 4) The meeting together of the members and their guests — meetings such as this one, which are both social and scientific and bring together the specialists from all fields of the arts and sciences.

Those are the four principal functions of the Academy, and they are all meritorious. They can be carried forward wherever we are domiciled.

And currently we have two dreams I should like to report, two goals for the future development of the Academy's opportunities and responsibilities. One is already officially recognized by the Council of the Academy and was reported in a brief sentence by our Secretary an hour ago. It is to increase the resources of our Permanent Science Fund, or perhaps establish a parallel fund, which will permit us directly to help in the researches of the non-science sections of the Academy.

The second dream, not yet openly known to many members of the Academy, is the creation of an award to recognize distinction in the humanities — an award that would in some respects parallel what the Rumford Medals do for distinguished investigators in the fields of light and heat, and parallel also the luscious awards in the medical

sciences sponsored by the Amory Fund. This proposed new citation might be called appropriately the Emerson-Thoreau Award. Several of us are interested in exploring this project, but to Mr. David McCord we owe the idea and the initial promotion.

And now, with the future of the Academy lively ahead of us, we say good-by to these walls and halls, but we shall take with us, to our new quarters, temporary or enduring, the happy memories we have accumulated here. Although we recognize the wisdom of the Academy's Council which sold the House, some of us are nevertheless sorry to go. But the management has for tonight wisely provided in the lounge above that with which sorrow can be assuaged.

Science and the Whole Man

*Phi Beta Kappa Oration delivered at
Harvard University on 13 June 1955*

CARYL P. HASKINS

It is indeed carrying coals to Newcastle to repeat in Harvard College that saying by President Lowell in 1909: "The individual student ought clearly to be developed so far as possible, for the college ought to produce, not defective specialists, but men intellectually well rounded, of wide sympathies and unfettered judgment." Two successive Presidents of Harvard have constantly emphasized this and today it is even more true. It is a dictum which, I suspect, lies at the very heart of the philosophy of Phi Beta Kappa. And yet I should like to return to certain aspects of it. For if new factors have not arisen in our society in the last ten years or so which sharply affect our understanding of the place and purpose of this student in his later years, there have at least been changes of dimension which condition both profoundly. They are changes which permit—not to say demand—vigorous and repeated re-examination of the role of the rounded individual as dreamer, as creator of beauty, as innovator, as gatherer of information, as leader. In our present-day society, with its high degree of technology and its enormous and increasing specialization, there is a very special challenge to the gifted individual—the individual creating, communicating, and leading. Possibly we cannot too often re-examine his role and the social need for him. This is especially true in the field of science, not only because of the technological basis of our society, but for other and yet more fundamental reasons.

Lord Beveridge has recently reviewed the old question of power and influence in the modern democracy, where such immense concentrations of power, such mass standardization, such dwarfing of the individual are possible. He defines power as the ability to give to other men orders that are enforceable by punishments, by sanctions, by the control of rewards, through the use, especially by governments, of the instruments of fear. Influence he defines in contrast to this: the moulding of the actions of others by persuasion, by the appeal to reason resting on knowledge and expressed primarily

through the spoken or the written word. Power and influence he sets in antithesis: the first as that which appeals to the elemental drives which man shares with other organisms, the second as that which captivates those higher emotional and intellectual faculties peculiar, so far as we know, to man. The first he holds to be evil; the second good. The first must be controlled in the future in every possible way—must be contained and made revocable. The second, insofar as possible, must be expanded at the expense of the first.

I have oversimplified this distinction in the telling of it. Yet even in the original it seems to contain much of the thinking of an earlier, simpler—and possibly a less basically democratic—era. And it is extraordinarily black-and-white. No one, I think, would deny the antitheses at the extremes of the spectrum. But the area of overlap is extensive and important, and this Beveridge largely ignores. If we still accept it as fundamental doctrine that, in the last analysis, a democracy does govern with the assent and approval of the governed—however ignorant they must be of technical points at issue in a given decision—then power and influence coalesce, and the attributes of influence—superior imagination, superior communicativeness and persuasion, superior judgment—do indeed remain, as they have always been, the essential elements of leadership. And these qualities are not, never have been, and never will be the attributes of groups of men. They are the attributes of the gifted, the free, the *unstandardized* individual. The role of leadership in our society still belongs to individuals of unusual temper and cultivation, in spite of the standardization of much with which we have to deal.

Now these considerations seem to me to add a rather new and special significance to a function of science which during and since the war has attained an almost frightening stature and importance and character—the service of science in government. As a phenomenon, the service of science in government is not new, and in the earliest days of our history was performed by some of our greatest national leaders. Franklin of course comes to mind at once. Perhaps it requires more reflection to recall that it was Thomas Jefferson who, while Ambassador to France and at the risk of his reputation and indeed his life, smuggled rice from Piedmont to establish a new American agriculture. Or that it was Jefferson who as Secretary of State in 1790 submitted a "Report . . . on the Subject of Establishing the Uniformity of the Weights, Measures, and Coins of the United States." Or that Jefferson, upon the recommendation of the American Philo-

sophical Society, transmitted to the Congress a proposal for the establishment of a United States Coast Survey, which was set up in the Treasury Department seventeen years later. And it was John Quincy Adams, when he was Secretary of State, who personally prepared for the Congress a similar report upon weights and measures.

John Quincy Adams was the last officer of cabinet rank to undertake any such specialized technical task as this in the national service, but the intimate link between science and government had just begun. There was the classic case of the committee of the Franklin Institute under the chairmanship of Alexander Dallas Bache, a great-grandson of Benjamin Franklin, which in 1832 with the help of a special appropriation of Congress and from the Treasury of \$1500 investigated the reasons for explosive boiler failures in steamboats. The report of that committee, made in 1836, resulted not so much in the improvement of steamboat boilers as in the establishment of the first federal authority to regulate business—the Steamship Inspection Service—a quite unforeseen outcome! Then there are all the later milestones, well known to you—the scientific departments of the federal and state governments, with their ramifying functions and structure and personnel and their extensive achievements, the agricultural and mechanical colleges of the nation, the special technical departments of the federal government, such as the Weather Bureau and the Bureau of Mines, and the hosts of ancillary government laboratories bringing science to government service in a thousand different ways. Over-shadowing these in magnitude, and often in immediate if not in eventual importance, have been the quasi- or fully governmental scientific bodies first established to bring emergency aid to the nation in time of military danger—the National Academy of Sciences, first established by Lincoln as a defense advisory body in the Civil War, the National Research Council, a product of World War I, the Office of Scientific Research and Development in the second World War, which, unlike most of the others, was terminated with the close of the emergency.

And now, since the second World War, we have yet another phase in this long development. It is marked by acute public consciousness of the role of technical research in our technical society. It is marked by a great public desire, now, to foster science to its fullest extent in the national service, both for internal development and for defense, financed by the national purse and under national control. It is marked by great generosity and by very large spending on the part of many

federal groups in an attempt to purchase the service of science *en masse*, as it were. It has resulted in enterprises which are relative giants of public research—the research departments of the armed services, the Atomic Energy Commission, the now tremendous research programs of public health and of agriculture, and to a somewhat lesser degree and in a somewhat different way, the newly arrived National Science Foundation. The advances in applied science have been enormous. The effect on the universities, and on the training of scientists in the universities, has been profound. It has been a period of titanic change, of great restlessness, often of considerable uncertainty.

There has been something peculiarly American about this development—something boundlessly optimistic, a firm faith in the virtues of energy that has carried us forward since before we were a nation; an expression of our national genius for engineering application and for industrial organization, for the mass-scale conduct of the applied sciences which through all our history has been one of our most heart-warming interests—reaching now peaks of which even our gifted forefathers could hardly have dreamed.

But I fear that with all this there has also come a certain degree of blindness, of which today we are only gradually and dimly becoming aware—blindness to the real nature of science, and of innovation, and of the nature of the individual and of leadership in all the societies of man.

This is not surprising. We are spurred by the optimism and the genius for large-scale application which has always been one of our most prominent—and our most successful—attributes. We know by long experience that mass production pays. We are spurred by the first experience we have had since the day of the Pilgrims of living without natural protecting barriers, exposed now once again to the untempered winds of the world. Why should we not conclude that research too—science in the service of government, and indeed science itself—will yield benefit and protection in direct proportion to volume? Science is obviously a national asset, now become one of the important ones. Why not treat it like any other asset—mass-produce it, organize it, streamline it, specialize and departmentalize it, and you have a titanic, producing machine? The theory surely works for industry—and we, as Americans, have demonstrated that as it has never been remotely demonstrated before in history.

There is nothing basically wrong with this concept, perhaps, so far

as it relates to the further development of the already known in science. When it enters the realm of the new, the untried, the unknown, however, when it demands true innovation, when it seeks for leadership of the highest order, it runs directly counter to the very nature of science itself, and of the phenomenon of leadership in human society. It is time, I think, that as a nation we turn our most serious attention to this essential contradiction.

Beveridge, in the study I mentioned earlier, has much to say of the mechanical aspects of government administration, and there can be no doubt that in our modern society this is a technical factor of major importance to the nation. But I think we must distinguish very clearly between the kind of effort which "tidies" and "herds" an endeavor along a more or less predetermined course, and that which visualizes new channels and occupies them, gaining public assent and approval at least for the main features of the course.

In a society as firmly technically based as our own, this function must often require men to whom the mode of the scientific approach, if not the substance of the special questions themselves, has long been familiar. But basically, of course, the function is one of leadership as we normally understand it, quite apart from its technical content. This leadership demands both imagination and technical competence of a high order. But it demands more than that. It demands the fullest exercise of "influence" in the Beveridge sense—influence which is a dynamic, not a static thing, as professional associations, scientific and other, all too often forget, influence that means constant persuasion, the constant winning of assent. This, overwhelmingly, is a function of communication. And communication of this sort is and must ever remain an individual affair. Moreover it is a function—and more supremely an important function in our present-day society, it seems to me, than ever before—of the gifted, the well-prepared, the well-rounded, but, above all, the *unstandardized* individual.

There can be no denying the fact, I think, that the difficulties of communication for this unstandardized, this creative and unorthodox man grow greater with the years, as mechanized orthodoxy threatens us ever further. It is poignantly evident in those arts whose followers must ever be complete individualists because of the very nature of their craft, if they are to remain faithful to it; where any effort at mass standardization ruins its quality and deeply frustrates its purpose. But it is no less true for that first cousin of the artist, the unorthodox scientist. The difficulties of communication are great;

yet however great they are, real communication and real leadership in either discipline in any forward-looking sense comes only through such individual men.

No one will dispute, of course, that the great ideas of science, the new mutations that have led human thinking into truly novel channels and have ultimately had immeasurable effect on human society as a whole, have been the product of great and unorthodox individuals—the Galileos, the Keplers, the Newtons, the Darwins, the Einsteins. But to the layman whose primary interest is not in science this truth is much less evident today than it is in the arts and letters. Perhaps it is less evident today than it has ever been. There are several reasons for this, I think, some of which inhere in the structure of science itself. Primary among them is the “cumulative” nature of science, where, in sharp distinction to arts or letters or even to philosophy, the achievements of every man must necessarily rest intimately upon the base established by hundreds or by thousands of fellow workers before his time, and can never be his alone in the same obvious manner as with the artist. Here the scientific innovator is as dependent upon the human matrix with which he works as a messenger bee upon its swarm. But too often we confuse the swarm with its messenger, and imagine that it is the swarm, not the messenger, that makes the truly new discoveries. Further, in science when great and individual innovations are made, they are—and often must be—brought to fruition by great efforts which are also science—or something very like it—yet which, in a subtle and essential way, are vastly different. These mass efforts represent the completion, not the beginning, of the cycle, and from them, I believe, equally great innovations are unlikely to come, because of the very nature of the enterprise. The distinctions between innovation and development in science—between “pure” and “applied” science if you will, between “science” and “engineering” if you will—are not easy to make, even by scientists. It is not easy to distinguish between the kind of effort that led, in the hands of a few gifted, inconspicuous individuals scattered widely over the world, to an understanding of nuclear reactions that ultimately made fission and fusion a possibility, before the war, and the kind of effort that makes huge teams and great government organizations in this field so effective and important to our national safety and well-being today. There is a great temptation to assume that, if only the money and the teams had been assembled before the war, the early phase of discovery and innovation by unorthodox in-

dividual genius might have been vastly accelerated, or indeed avoided altogether. There is a great temptation, not only to the general public but even to some scientists, to think today that great innovation is simply proportional to the money and the manpower expended. This, I am convinced, simply is not true. It is confusing the end with the beginning, the means of development with the essence of discovery. The essence of discovery, in science as elsewhere, in our present mechanized society no less than in the agricultural nation of Jefferson's time, still lies with the gifted, the rounded, the uncommitted, the unorthodox individual—more indispensable today than he has ever been.

The kind of massive scientific approach that is being architected today by many great organizations, and most of all by government, is tremendously useful and tremendously important, in the proper context. It is undoubtedly with us to stay. To be sure, it has its own very acute dangers, which I shall not attempt to talk about today. Instead, I would ask the one question about it which seems to me most relevant: Is it enough? Is it indeed other than an ancilla—a late ancilla—in the work of the gifted individual?

Let us consider this question for a moment in the context of national service itself. If we say that it is enough, we say in effect that the contribution which we seek from science to government lies primarily in terms of the kinds of technical data which can be supplied only by the expert, and on a mass basis. Now the need of modern government for technical data of this sort—for reams of it in very many areas—is all too obvious. What effective decision of military strategy can be made today without including a comprehensive array of scientific and technical findings—or in matters of national health, or welfare, or a dozen others? But what we may forget is that information of this kind, which can be supplied by great teams of experts, is in several respects both limited and static. It deals with measurable things, with questions of fact alone. It deals with the state of the field at the time that the information is given—only rarely, in ordinary circumstances, does it seek to extrapolate that information to the time and the circumstances where it will be most relevant. And above all, it cannot, by its very nature, reconcile its own field of information with the thousand and one elements that are vital in any real situation—the impact of other fields, the adjustment to other and quite different conflicting claims, the cogency of the information to particular sets of circumstances.

This sort of mass production of technical information is one kind of service of science to government. But I doubt if it conforms very closely to the concept of Jefferson or John Quincy Adams. Those other and more vital tasks of science in government, so important in illumining public policy in highly technical situations, cannot be the work of the narrowly trained specialist and they cannot be the work of teams. These are the functions of leadership, not of craft, even though that leadership must be effectively craft-trained. They demand individuals who are natively gifted and highly rounded and scientifically trained, and of men with native endowment for effective communication.

Science and technology, like the law before it, has now come to provide out of its accumulated knowledge many of the sinews that knit our society. Both professions have highly specialized methods and techniques which are extremely relevant to the contemporary scene. But each must be aware that, however massive in numbers, however complex and tightly knit in organizational terms each profession may become, it is only through the media of great judgments, great imaginations, great personalities, *given or developed by individuals*, that wisdom and true innovation can be coined and effectively imparted to the nation. The lawyers knew this long before the beginning of our country, and the public has long recognized the essential individuality and the essential non-conformity of their great names in the public service. It is only in very recent years that the contributions of science in the public service have reached major dimensions. It is only slowly that it can be explicitly recognized, even within the ranks of science, that the highest public contributions can only be made by men who are not only impeccably trained in their own fields but who can weigh and balance component against component, value against value, in an immensely complex and shifting scene, and can communicate the result of that weighing effectively to those who must make the final decisions. It is not yet fully realized that this service, which is quite distinct from that of the supplying of information, and in the last analysis is of a higher order and of greater importance, can only be the function of the individual, and of the individual trained to leadership.

I have made a plea this morning for the gifted, the rounded, the unorthodox, the unregimented individual in science, protected and encouraged in the face of the mass organization of things scientific as well as of other elements of our national life which we must face

today. I have made it primarily in terms of the unique function which only he can perform in placing science at the service of the nation, primarily through the channels of government. I have used that frame of reference because it seems to me one of overwhelming practical importance, and one which needs more attention than it is getting today.

But of course this is only the meanest reason for the defense of the independent, the unorthodox, the highly original worker in the scientific as in any other creative field. The greatest and the truest and the most compelling reason lies in the very nature of science and scientific research itself. For the whole stature—the very life—of our culture and our very appreciation of the world and our harmony with it rest with him and his fellow creators in the arts and literature and philosophy and religion. It is the gifted unorthodox individual in the laboratory or the study or the walk by the river at twilight who has always brought to us, and must continue to bring to us, all the basic resources by which we live. Let us guard and honor his position and his profession with every resource that we can muster. Amid the turmoil of the superhighways and the organization and the standardization and the mass approaches with which we must live now and in the future, we must seek more than ever to find and nourish and appropriately train, and to protect and cherish, that irreplaceable element of our society, the individual unorthodox explorer.

As we began, so we may conclude in Lowell's words:

Man cannot set a limit to his thought. Man cannot conceive of a boundary to space, or a time that began and will end because he cannot fetter the processes of his own mind. He was made for infinite conceptions of which he is to partake. Only at infinity can the vision be finished and the end complete.

Rembrandt the Draughtsman

with Consideration of the Problem of Authenticity

JAKOB ROSENBERG

THE attraction of Rembrandt's drawings is steadily increasing. To give just one instance: when I visited Europe in 1949, after a long absence, I called in London upon a prominent collector of drawings whom I had known before, eager to see what he had added to his collection during the past ten years. A man of considerable means and discriminating taste, this collector had started out as a passionate lover of Rubens oil-sketches and drawings. But now his highest ambition and dearest wish is to acquire drawings by Rembrandt. He complained how little opportunity there is left of finding a real Rembrandt drawing for a reasonable price, and he confessed that it took him many years and many detours to realize the immense artistic charm of the great Dutch master's draughtsmanship.

I mention this case because it is somewhat characteristic of the modern sophistication which has developed in the appreciation of master drawings. This appreciation owes a great deal to the period of Impressionism. It was the Impressionists who sharpened our eyes to the attraction of sketchy and spontaneous representations in art, such as drawings can most easily produce. The Impressionists were opposed to overdetailed and highly finished styles. They rejected all laborious techniques and processes which take away from the work of art its charm of freshness and spontaneity. Only when this precious quality of instantaneous vision and spontaneous treatment is preserved, they believed, can the spectator come into close contact with the artist's personality and participate in his creative sensations.

There is little doubt that Rembrandt's drawings satisfy such "impressionistic" demands. But it is not only the spontaneity and directness that attract us. There are many more qualities implied, such as his striking grasp of form and character, his intense suggestion of space and atmosphere, the originality and expressive power of his graphic language, and last, not least, the intimacy and profundity of his human interpretation. These are qualities which Rembrandt's

drawings exhibit even more than his etchings and paintings, and which go beyond the range of Impressionism.

However, Rembrandt the draughtsman was as unusual in his own century as he is when set beside the Impressionists. There was no other artist in the Baroque period who could compare with him for range, variety and expressiveness of draughtsmanship, although the 17th century abounded in graphic talent and even genius. If we take Rubens, the greatest representative in Northern Europe before Rembrandt (fig. 1), we must first admit that his drawings hold their own in vigor, directness and pictorial attraction. But it is undeniable that drawing did not mean as much to Rubens as it did to Rembrandt, who cultivated it as an art for its own sake, with an immense range of expressive values. For Rubens drawing had only a subsidiary function in relation to painting. This was the Italian tradition in which he had been brought up. In the Italian Renaissance, as still with Rubens, drawing served primarily to prepare pictorial compositions. It furnished a quick draft but more often detailed models for later execution in painting, as the drawing in figure 1 served as a model in a painted "Adoration of the Shepherds." Drawing was seldom practiced for its own sake. For Rembrandt, on the other hand, there was sheer pleasure in the art of draughtsmanship; it served as a favorite means to study nature and life in its diverse aspects, and beyond that, to express imaginary subjects, often independent of any later execution in another technique.

Rembrandt's position as a draughtsman is also unique in relation to other Flemish or Dutch masters of the 17th century. There were some to whom he was indebted for his youthful style, with its electrifying vivacity. Among these forerunners I would count van Dyck, whose impulsive and angular pen drawings, like the sketch after a Titian composition of "Christ taken prisoner" (fig. 3) give a premonition of the young Rembrandt's penmanship. Also Adriaen Brouwer, the ingenious founder of the lowlife genre in Dutch and Flemish painting, may be named among Rembrandt's forerunners. Brouwer's vivid impressionistic sketches of peasants and tavern scenes (fig. 4) were obviously known to Rembrandt and seem to have influenced his bold early penmanship.

And finally his teacher, Pieter Lastman, (fig. 2) left some traces of his Baroque draughtsmanship in Rembrandt's work. But none of these earlier draughtsmen and forerunners extended the range of their activity beyond the traditional boundaries. With them draw-

ings, in general, still served primarily a preparatory function or were confined to a highly specialized category such as landscape, genre or historical compositions.

It may not be necessary to carry this comparison further, either with Rembrandt's contemporaries or with modern draughtsmen. It will be sufficient to state that it was Rembrandt who raised the art of drawing to a principal form of artistic expression, with the widest possible range and with a considerable independence from his painted or etched work. From Rembrandt's drawings we learn the vivid experiences of his daily life (fig. 5), his human contacts, his artistic sensations, at home, on the street and in nature. And beyond this his drawings reflect the creative activity of his mind in purely imaginary subjects, like the scene from Rembrandt's mature period, representing St. John and St. Peter healing the cripple at the door of the temple (fig. 6). Rembrandt was so organized that he could not abandon any thread he had once taken up. This growing productiveness of his mind, this constant development of favorite subjects, with an ever deepening interpretation, are reflected in his drawings because only here, rather than in the more laborious techniques of etching or painting, could he materialize this overflow of vision with the necessary speed. Therefore it is justified to say that one does not know the whole Rembrandt if one does not know his drawings. In addition, I may say it is his drawings that give us perhaps the deepest and most intimate insight into the immense complexity of his genius and his artistic procedures. From them we learn that nature and life were a constant source of inspiration to his art; from them we also learn that the invisible, spiritual world of the Bible never ceased to nourish his imagination. The borderline between these worlds, the actual and the imaginary, merges to such a degree that his biblical scenes seem to be real, while his studies from life and nature are filled with the spirit of his inner world.

In the self-portrait of about 1629, an oil painting in the Royal Gallery at The Hague, we see Rembrandt at the age of 23 (fig. 7). We realize the young artist's energetic and sensitive character, also his romantic taste in the way he dressed up as an officer with a steel collar. The illumination strikes us as very dramatic; we notice also a detailed, almost minute execution in parts — in the hair, the breastplate, and elsewhere. It was some time before Rembrandt was able to overcome this laborious character in his painting technique.

Turning to a drawing of the same period (fig. 8) — it seems to be a

preliminary study for the previous painting—we meet with a bolder and freer touch, a greater directness and even suggestiveness. There is the same dramatic chiaroscuro—which means contrast of light and dark for the sake of a vigorous pictorial expression. The design is organized in three values: deep darks, half darks, and lights, with some transitions between them. The surety of accents is amazing, also the ingenious use of pen and brush and their intricate cooperation. In his speedy execution the young Rembrandt remains quite selective, omits a form here (the ear), stresses another there (the curl on his forehead), yet the general impression is that of a most spontaneous creation, in contrast to the painting of the same year.

When we turn to one of Rembrandt's earliest etchings, representing St. Peter and St. John healing the cripple at the door of the temple (fig. 9) we find a rather coarse use of this technique, with some failures in the biting of the acid into the plate, noticeable in the dark diagonal streaks across the composition. It is an unusual attempt to express his bold early draughtsmanship in etching, which in this case was unsuccessful due to his technical inexperience. There exists the preliminary sketch for the figure of St. Peter, which appears reversed in the print. It is a chalk drawing belonging to the Museum in Dresden (fig. 10), and here again we can appreciate the surety of the young Rembrandt's touch, a quality which his draughtsmanship showed from the very beginning. It is a vivid sketch from life, with dramatic accentuation on movement and expression. The bowing gesture of the old man in his ragged garments (the model may have been a beggar from the street), his hands, so markedly spread out, the intense glance—all of these features are strikingly set down in a speedy sketch which already has the characteristic organization of Rembrandt's drawings: in these vital points (head, hands, back) the draughtsmanship is sparse and placed with great economy, while he masses the strokes only in the shadows of the ragged garment where the figure bends. The easing up of the touch toward the contours gives the suggestion of light and air surrounding the figure, and the vivid angular strokes lend a strong momentary life to the appearance of the old man.

I may bring in one prominent example of Renaissance draughtsmanship—Dürer's sketch of a seated woman holding a flower (fig. 11), to make us aware, by contrast, of the strong Baroque features inherent in Rembrandt's early drawings. With Dürer, the Renaissance master, the line serves primarily to define form in its plastic entity.

With Rembrandt there are more vigorous contrasts of light and dark, a bold omission of line here and there, to indicate light and atmosphere playing over the surfaces. There is a greater immediacy of touch, and stronger emphasis on movement and psychological content — altogether a more exciting momentary effect by a dynamic and pictorial type of draughtsmanship.

With the drawing in red chalk of a seated old man, dated 1630 and belonging to the Rosenwald Collection (fig. 12), we have another confirmation of the brilliant Baroque qualities of the young Rembrandt's draughtsmanship. We find again active movement expressed, even in a seated figure, a strongly pictorial character by a vivid interplay of lines and tones. The contrast of light and dark is vigorous yet softened by fluid transitions; the expression dominates and is brought out with a sensitive lightness of touch in the face. Rembrandt's fondness for old people is a peculiar feature of his art from the very beginning. He was attracted by the unusual richness of inner experience visible in their lined faces. It may be that such fondness was implanted during Rembrandt's childhood by his Bible-reading elders, and resulted from the deep impression made upon his imagination by the patriarchs of the Old Testament.

I stressed the Baroque features in Rembrandt's draughtsmanship, but one must also emphasize how far ahead of his time he was, in the suggestive spontaneity of his drawings, compared to the average Dutch artists. In the drawing of a sick woman in bed (fig. 13) by Frans van Mieris, a respectable genre painter of the mid 17th century, we meet with certain rather common qualities of the Dutch: a detailed realism, an almost photographic description with an even emphasis on all surfaces, whether they are hands, bedcover, or objects on the table. There is nothing suggestive or imaginative in this type of draughtsmanship. It does not go beyond an accurate and rather dry, although competent, rendering of the visual reality.

When we turn to a similar subject among Rembrandt's drawings — a pen and brush drawing representing Saskia in bed, attended by a nurse (fig. 14), we realize that Rembrandt has much less interest in the complete rendering of mere matter — that he is highly selective and dramatic in his accentuation. With his far more flexible touch he creates dramatic relationships in space, as well as psychological tension. He boldly omits part of the composition in order to give added force to the vital points, and his graphic touch ranges from very forceful, broad strokes to the most delicate and thin lines, as

the tonality too embraces a wide scale of values, from brilliant lights to deep darks. There is no hesitation, only a striking immediacy, in spite of the intricate organization. As I said before, here light-and-dark contrasts serve as a brilliant means of spatial definition, relating distant planes at will, but also focusing the interest on the essentials: the mood of the sick woman. For this area Rembrandt reserves the greatest subtlety of touch, here the slightest variation of accent counts.

Figure 15 is a charming little sketch in silverpoint representing Saskia at the time of her engagement to Rembrandt, that is, in 1633. We realize how much she meant in the artist's life. There is an air of happiness surrounding her. Saskia, by the way, came from a patrician family, while Rembrandt was of humbler origin. Thus, at her marriage, she brought him a considerable fortune, and may also have helped Rembrandt to make contacts among the upper circles in Amsterdam. The lines swing in Baroque curvatures, with the most easy and graceful touch. The expression dominates again.

There are more prosaic sketches from the time after the marriage, but none of them lack vividness and directness. Figure 17 shows Saskia asleep; we even seem to hear her breathing. There are two sketches of her with a slight but noticeable variation. In both the completely relaxed attitude of a person asleep is strikingly brought out; in the lower study the body seems more contracted, she has sunk into the pillows and seems to breathe more deeply through her open mouth.

Rembrandt also observed closely the growth of his children. Figure 16 is a pen sketch, again the record of two successive moments. Interest is focused on the feeding of the newborn. He observes and describes how eagerly it sucks at the bottle, in the upper sketch leaning back and half asleep, and in the lower one rising a little, with an increased effort, also on the part of the nurse's helping hand. We admire the rare economy of strokes in these pen sketches. Speedy as they are, they grasp the decisive features.

Figure 23 is a chalk sketch of two women — it may be mother and grandmother — teaching a baby to walk. It belongs close to 1640, in other words, to Rembrandt's middle period, when his draughtsmanship gains a tectonic quality, when the forms are more firmly built and their cubic character is emphasized. Wonderful is the characterization of movement in the two women, the younger one on the left bending over with ease, the other obviously stiff with age. The focal interest in the child is maintained by sharper delineation.

tion in this area. The drawing is a brilliant example of the suggestive power of Rembrandt's quick sketches.

While the typical Dutch genre painters like Terborch, Metsu, and others chose only the more appealing moments of daily life for their representations, Rembrandt has an eye for all vital reactions, as we know from his drawings. His babies are often naughty, the mothers shown as tired from their exhausting maternal duties or quick-tempered in dealing with their problems. This is the case in Figure 18, a pen and brush drawing belonging to the Morgan Library. The boy seems reluctant to leave his toys behind, the mother has grasped him energetically and walks down the steps. We see again a dramatic use of chiaroscuro, here with a light silhouetting of the group against the open air. But the drawing is not only pictorially striking; the mother-child relationship is sharply characterized.

Figure 19 is perhaps a study of Rembrandt's second wife, or we may say, companion, Hendrickje Stoffels, looking out of a window. It belongs to his later period, to the mid-fifties of the 17th century. These later drawings show a softer and richer character in their tonal treatment. The light is brilliantly rendered around the head with most sensitive gradations. The features are effectively set off against the square form of the shutter with fine and incisive lineament. The broad areas of shadow show a velvety depth and are more luminous than the reproduction indicates. A beautiful painterly quality is felt throughout.

Hendrickje fallen asleep, leaning against the arm of a chair, is shown in Figure 20. It is a pure brush drawing of powerful breadth such as Rembrandt often produced in his late work. One can well imagine that Renoir, in his late period, was fascinated by such sketches, by the compactness of form as well as the brilliant suggestion of light and atmosphere. The reflected light on the hair creates a special pictorial attraction, between the massive dark accents of the foreground and the more hazy chiaroscuro of the background. The open character of the foreground is very suggestive. The diminishing width of the strokes indicates the recession in space.

In the delightful chalk study (fig. 21), which Rembrandt used for the figure of Susanna in his painting of 1647 in the Kaiser Friedrich Museum, we meet with a sensitive impressionistic character that reminds us of Degas, rather than Renoir. The model seems to be the young Hendrickje shortly after she had joined Rembrandt's household as a maid. In his middle period Rembrandt shows himself par-

ticularly sensitive to atmospheric effects, as we know also from his landscape drawings. It is with the utmost delicacy that light and air here play around the youthful nude shoulders; the accents on head and hand could hardly be more telling.

Turning to other daily-life motives which he encountered on the streets rather than at home, we find in Figure 22 a sheet of studies of beggars and an old woman with a crying child behind her. This sketch brings us back to the Thirties, as is evident from the Baroque character of the line and the vivid instantaneousness of the gestures. In spite of this very momentary character of every figure, they seem to be interconnected by the same ornamental quality of line and by the arrangement in two parallel diagonals running across the sheet. These formal features the artist may have brought in instinctively, but they lend to the diverse sketches a charming decorative coherence on the page.

The pen study of a beggar-woman in Figure 24 comes closer to the middle period and could well be a preliminary study for the "Hundred Guilder Print," although the mother-and-child motif in the center of the famous etching is shown in a different attitude. Rembrandt was unique in his sympathetic understanding of the poor and destitute. He is deeply human but never sentimental. The expression of exhaustion, of motherly care, is magnificently expressed.

The pen and brush study of two Jews on the street (fig. 25) dates from about 1655 and shows Rembrandt's rich late style of draughtsmanship. Forms seem to glow as much from within as they are illuminated from without. We observe a striking characterization of the Oriental features and strange costumes which are brought out with broad summarizing strokes. The graphic sharpness of Rembrandt's early line is now abandoned in the interest of a broader and softer painterly treatment.

Rembrandt is also unsurpassed in his studies of animals, of wild and exotic beasts that he was able to see in the traveling zoos which visited Amsterdam. A chalk study of a lioness eating a bird (fig. 27) shows an amazingly quick and powerful grasp of the structure and the rapacious character of a full-grown lioness. While she crouches holding her prey between her outstretched paws, the potential strength of her wiry body is marvellously expressed with only a few decisive strokes.

In 1637 Rembrandt saw and sketched an elephant (fig. 26). It is quite obviously an open-air study. The black chalk does justice to

both the massive frame and the curiously wrinkled surface of the giant creature. The artist must have felt that this was a rare opportunity, because he added here — as he seldom did in his drawings — his full signature and the date.

One more sketch of a lion is shown in Figure 28. This may belong to the late fifties, in other words, it is in Rembrandt's mature style of draughtsmanship. The animal is seen in a majestically relaxed pose, yet watching with an alert glance. Rembrandt made use of such studies in his biblical compositions. An elephant, for instance, appears in his etching of "Adam and Eve," from the same year as the drawing in Figure 26. Lions appear in a sketch of "Daniel in the lions' den" (fig. 29), where the artist stressed the contrast between the innocent young prophet and the ferocious beasts. The latter are superbly characterized in their different attitudes, varying from fiercely threatening to almost affectionate movements.

Landscape drawings as dramatic as Figure 30, showing cottages against a stormy sky, are rare. Rembrandt usually applied this type of romantic illumination to his paintings. It is a comparatively early drawing, perhaps from the end of the thirties, when the Baroque quality was still strong. Emphatic diagonals and contrasts of dark and light animate the composition, lead the eye into the distance, lending to the picture a vivid, dynamic quality.

At the time of Saskia's illness around 1640 — she died in 1642 — Rembrandt often strolled in the environs of Amsterdam and made many sketches of the Dutch countryside like the "House among trees on a canal" in Figure 31. They are highly sensitive, unassuming studies of nature, superbly expressing the wide spaciousness, the seaside atmosphere, the simplicity of Dutch landscape, always with a delicate touch of the pen and the brush and ingeniously exploiting the white of the paper as a source of light. The landscape drawings of the fifties grow bolder, like the sketch of a similar motif, "Cottages among high trees," with the curve of a road in the foreground (fig. 32). Rembrandt now stresses more forcefully the structural features. He is also more summary in his technique. The atmospheric quality is retained and enriched by stronger value contrasts. The wide sweep of the foreground road leads vividly into the distance and we feel the power of the sunlight as well as the breezy sea air.

Figure 33 is an imaginary sketch from his early maturity showing a view of London, marked by the Cathedral of Old St. Paul's, as a contemporary engraving must have represented it, for Rembrandt,

it seems, never went to London. While this study appears to be the work of a few minutes, and done without hesitation, it combines monumentality with sensitiveness of touch. We are drawn into the distance by the powerful contrast of dark and light. Yet there are subtle transitions and at no point is the sequence of planes interrupted. In the bright and hazy distance the building retains its structural clarity and is bathed in a beautiful sunlight.

Coming finally to Rembrandt's biblical subjects, Figure 34 shows a drawing from his early period, from about 1633, representing "Christ in the house of Mary and Martha." We know from his paintings and etchings that Rembrandt was from the beginning a vivid story-teller. You will remember this biblical story in Luke X, 38-42, emphasizing the value of a contemplative life. Christ had entered the house of Martha and, as the text expresses it: "she was cumbered about much serving, and came to him and said, Lord, dost thou not care that my sister hath left me to serve alone? Bid her, therefore, that she help me. And Jesus answered and said unto her, Martha, Martha, thou art careful and troubled about many things: But one thing is needful: and Mary hath chosen that good part, which shall not be taken away from her." The three figures in the drawing are intensely related by gestures and glances. Emphasis is given to Christ through the converging lines of the background. Mary, the contemplative one of the two sisters, appears frontally, with a book on her lap; Martha, the busy housewife, is the closest of the three, but seen from the rear. There is the characteristic diagonal arrangement of the Baroque, leading the eye from the foreground into the middle distance, where the interest focuses on the two figures of Christ and Mary. We see the same vivid and flexible use of line, for both expressive and pictorial purposes, as we saw in Rembrandt's early studies from life. He masses the lines here with dense strokes, and opens them there in a more widely spaced shading. There is still the graphic sharpness of his early style, without a finer tonal softness.

This tonal softness is apparent in a biblical scene from his middle period, about 1640, representing "Jacob's Dream" (fig. 36). Jacob has fallen asleep on a stone which served him as a pillow, "and he dreamed, and behold a ladder set up on the earth, and the top of it reached to heaven. And behold the angels of God ascending and descending on it." Here Rembrandt shows only two angels looking tenderly down on the sleeping Jacob. The ladder is omitted. Rembrandt took such liberties with the biblical text when it served a

more concentrated expression of its deeper meaning. In fact, through the reduction to a few figures and the spatial limitation, the artist makes us intensely aware of the inner relationship between these divine messengers and the sleeping wanderer. The delicate tonal treatment, the sensitive touch of the pen and the brush, help to create a transcendental atmosphere and relieves the scene of any obtrusive realism. The human intimacy and tenderness expressed is a general feature of his art in this critical middle period after the illness and death of his wife Saskia.

As in his landscape studies, so in his biblical scenes, the simplicity of his compositions increases in his later work, and to the sensitiveness of touch is added more power and depth of expression. In the scene representing "Christ, followed by some apostles, healing a sick person" (fig. 35), the group of Christ and the apostles is taken together into one square block, while the group around the sick person forms a triangle. Both groups are intensely related. These formations are far from being geometrically rigid: light and air permeate everywhere and lend vibrance to the lineament and the tonal play. One feels a great spaciousness around the figures, and atmosphere in a double sense, physical and spiritual. Rembrandt's style has now reached the highest point of economy and selectiveness. The dignity of the Christ figure equals that of the great Renaissance masters.

The last example in this survey also belongs to the period of about 1655 and may come close to 1660. It represents "St. Peter's prayer before the raising of Tabitha" (fig. 38). The subject is taken from a passage in The Acts of the Apostles IX, 40, where we hear that Tabitha, a pious woman "who was full of good works" had died, and that the disciples of St. Peter sent after him for help. "When he was come," the text says, "they brought him into the upper chamber; and all the widows stood by him weeping and showing the coats and garments which Tabitha made while she was with them. But Peter put them all forth and kneeled down and prayed; and turning him to the body said: Tabitha, arise. And she opened her eyes, and when she saw Peter, she sat up. And he gave her his hand, and lifted her up, and when he had called the saints and widows, presented her alive."

It is not accidental that Rembrandt has chosen here the moment when St. Peter was alone at prayer. Not the outward action, not the miracle as such interested him, but man's innermost contact with the

Divine, as the real source of his power. And this he rendered with superb mastery. From Rembrandt we learn that this contact occurs only in absolute stillness, when man turns inward in humility and awe. In his drawings the artist, as we have seen, was receptive to all spheres of life, at home, in the streets, and in nature. But it is in the sphere of religious experience that he has told us the most profound things. While his late paintings of such subjects are perhaps grander by their monumental size and the extraordinary use of color, Rembrandt was able to express the essence of his credo also in pure draughtsmanship. The composition in this drawing is again of a noble simplicity. Pen and brush are used with utmost delicacy and economy. No one ever drew with such miraculous lightness and suggestive power.

This is as far as I can go here in discussing the character and range of Rembrandt's drawings and their significance in the history of draughtsmanship. But since I am facing an audience of scientists as well as humanists, I must expect a sound skepticism with regard to the validity of my statements, interpretations and conclusions. The scientists in particular will ask: "How do you know that the drawings you have discussed are really by Rembrandt? What scientific proof do you have for their authenticity?"

Here we have to admit at once that, except for a few cases where drawings are signed by the master's hand (the drawing of the elephant, for instance, was one of these rare cases), we have no absolute proof. All we can hope to attain is a reasonable certainty about the authenticity. And this reasonable certainty comes about by what we may call cumulative evidence.

1. There is first the judgment of the so-called expert or connoisseur — let us say in a more modest way, specialist, who is thoroughly familiar with the material and has proved, over the years, his competence by exposing his judgment to professional criticism.

2. There is second the "consensus omnium," the general approval by all the experts, adding certainty to the judgment of the individual.

3. And there is finally — and this is not unimportant — something that we may call the test of time, that is, the judgment not only by one generation of connoisseurs, but by successive generations of active and critical specialists. This is, in fact, what has been going on during the last fifty years.

The first comprehensive catalogue of Rembrandt's drawings was published in 1906 by the Dutch scholar Hofstede de Groot, who

listed altogether 1613 drawings by Rembrandt. To some of them, however, he added question-marks.

In the next generation there followed in the mid-twenties (1926) and the early thirties (1934) a new publication by W. R. Valentiner which was not carried to completion but included at least two-thirds of Rembrandt's total work. (The volume on landscape and genre scenes has never appeared.) Valentiner in these two volumes of the so-called "Klassiker der Kunst" series rejected many attributions of Hofstede de Groot and added, on the other hand, many new ones.

Finally, this year has seen the beginning of the publication of a new standard edition of Rembrandt's drawings by the Austrian scholar Otto Benesch. The first two volumes dealing with Rembrandt's early period are just out. Four more will follow soon.

In this succession of three generations, from Hofstede de Groot to Valentiner to Benesch, we notice a sharpening of criticism by the combined effort of many scholars. Of substantial help were the special catalogues of Rembrandt's drawings in the great European collections, that is, in London, Paris and Amsterdam, by Arthur M. Hind, Frits Lugt, and Max Henkel respectively. I am responsible for the catalogue of the Berlin collection. In summing up the results statistically, one can say that since Hofstede de Groot about one-third of his attributions has been eliminated as doubtful, but this loss has been balanced by an equal number of new discoveries.

In spite of this steady progress, we are still far from a "consensus omnium," if I may take Benesch's first two volumes as a basis for such judgment. Of the questionable material that has been eliminated, three groups can be distinguished: old copies, pupils' drawings, and forgeries.

1. As for old copies, it is understandable that previous generations have been deceived when meeting with them without knowing the originals. Superficially seen, there is often enough of Rembrandt's style and even spirit reflected in such an old copy (fig. 39) to engage our interest and to let it pass as his work. But once we have become more intimately familiar with authentic drawings, and have, in addition, a chance to compare the copy with the original (fig. 40) we feel a certain thinness, emptiness, a mechanical and abrupt use of the line, a lack of finer tonal gradations. The true sketchiness of Rembrandt's real drawings, the atmosphere, the subtle gradation of accents, both formal and psychological, are missing. Look at the main group of Mary embracing the dead Christ at the lower left, or the

play of hands in the center around Christ's raised left hand, or the two faces above, of St. John and one of the Maries. And compare these passages, as well as the total impression, with the original. Then I believe you will feel a lift to a higher plane of artistic performance in Rembrandt's authentic work and touch, which is so infinitely finer, grander, and more lively, more complete also in the suggestion of form in space. Yet the copy, which is in the old royal collection in Stockholm, was for a long time considered an original.

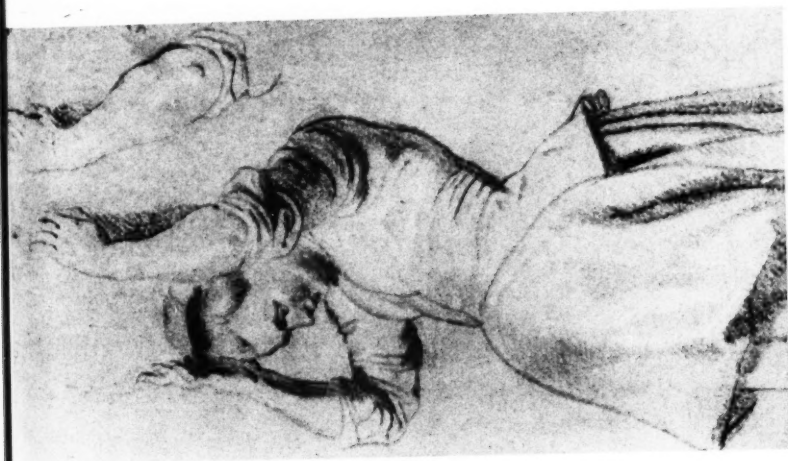
2. As for drawings by Rembrandt's pupils which have often passed as the master's work, the example in Figure 37 may serve our purpose. The beautiful drawing of the same subject, Jacob's dream, by Rembrandt's own hand, is shown in Figure 36, already discussed. There we saw Jacob fallen asleep on a stone, and two angels appearing above on the left. We admired the delicate tonal treatment, the sensitive and economic touch of Rembrandt's pen and brush which created, with a minimum of means, an atmosphere of wonder and even transcendence. And then see what a pupil, Ferdinand Bol, produces when dealing with the same subject and trying to follow the master. He is certainly sketchy, but he overdoes this quality by massing lines into heavy darks and losing all the finer points of Rembrandt's draughtsmanship, with its superb sensitiveness and economy, the wide yet highly articulated range of the accents, the simplicity and clarity that is combined with infinite refinement.

And finally, for the third and most vexing group, — that of the forgeries, which we must be prepared to face in ever new and ingenious versions — Figure 41 shows one of the oldest known examples, which pretends to be a preparatory sketch for a well-known painting by the master representing the "Adoration of the Magi" (now in Buckingham Palace). This drawing along with many others — equally false and also in Munich — goes back to the 18th century, when a wave of enthusiasm for Rembrandt drawings started and the demand for them made a forger's activity profitable. It was at this time that this whole "Munich" group was acquired by the Count Palatine and thus came finally into the Bavarian State Collection in Munich. The puzzling thing about the drawings is not only the comparatively early date (they may go back to the first half of the 18th century, after Roger de Piles first expressed a high appreciation for Rembrandt drawings and himself brought together a considerable collection), but also the fact that even today Rembrandt experts can be deceived by them (see *Mitteilungen der Gesellschaft für*

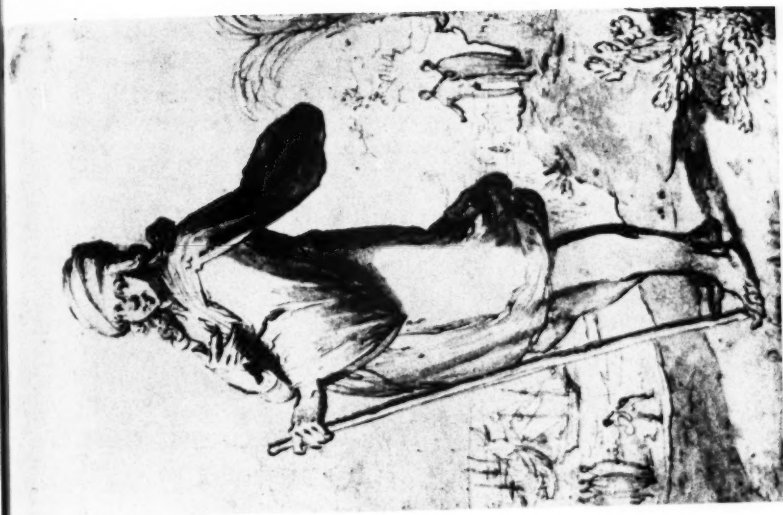
vervielfältigende Kunst, Vienna, 1925, p. 37). In the drawing reproduced in Figure 41 it was a clever trick of this early forger to suggest a draft for a still-existing Rembrandt painting, because this relationship easily obscures the inherent weakness of the drawing, and proved deceptive in the case just mentioned. The weakness becomes evident upon closer comparison with a convincing drawing of this late period, such as the "Arrest of Christ" in Stockholm (fig. 42). We will then realize the confusion there is in the crowd above the Madonna, and in the spatial organization. The lines, moreover, in their exaggerated dashiness are often meaningless. Forgers in general are apt to exaggerate a few aspects of a master's style but are unable to control all the other essential features which belong to it. This one, by his over-dashiness, lost not only the clarity of form and of spatial coherence, but also the all-embracing atmosphere and the gradations of tone, the economy and control, with clear and expressive relationships throughout. In the Stockholm drawing there is also a foreground crowd; but how clear, how articulate, how integrated is every figure, in spite of the sketchy character of the whole. And how wonderfully the whole reads, by a distinct order of accents.

In conclusion I show you a fine late self-portrait by Rembrandt (fig. 43), which conveys the full power of his personality. I hope that the inclusion of doubtful material in this discussion does not leave you with the impression that Rembrandt's drawings are still too controversial and that one had better keep away from them, letting the experts quarrel about their authenticity. No, we have gained considerable ground in our certainty about the authentic material, as I have tried to show — but we must continue to draw valid criteria from the fully convincing drawings.

Naturally some people may be bothered by the element of uncertainty that remains here and there. But this can be regarded as a healthy challenge, rather than a drawback — a stimulus to keep our criticism alive and heighten our alertness. In fact, it forces us to an intense consideration of an artist's style — and even of his potentialities. And, as I have said, cumulative evidence helps to overcome the difficulties of the authenticity problem (so it has done in the case of the Munich forgeries, where the younger generation sides with the majority of the older critics in rejecting them). We can thus hope to attain in due time the goal of a reasonable certainty about the whole range of Rembrandt's authentic production.



1. P. P. Rubens: Girl bearing a jug.
Berlin, Print Room.



2. Pieter Lastman: Young man with a staff.
Amsterdam, Print Room.



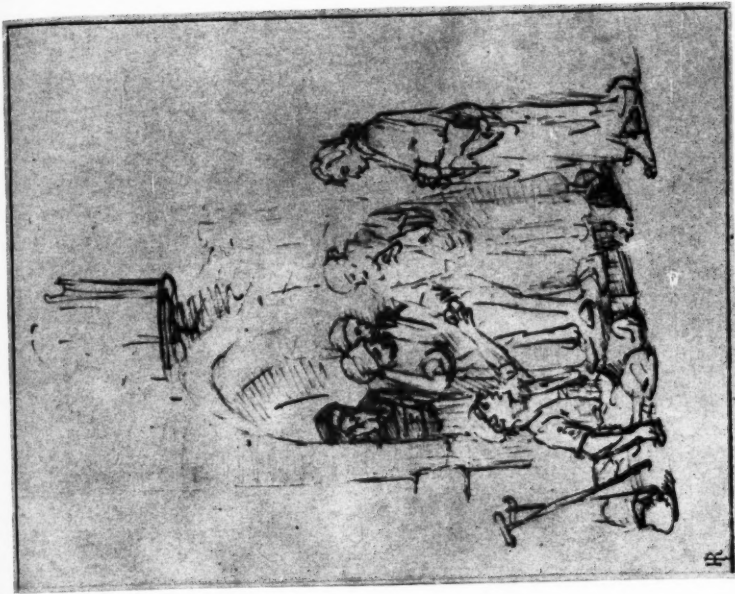
3. A. van Dyck: Christ taken prisoner. Chatsworth, Duke of Devonshire.



4. A. Brouwer: Studies of figures. Berlin, Print Room.



5. Rembrandt: Studies of heads and figures.
Birmingham, Barber Institute.



6. Rembrandt: Sts. Peter and John at the gate of the temple.
New York, Metropolitan Museum.



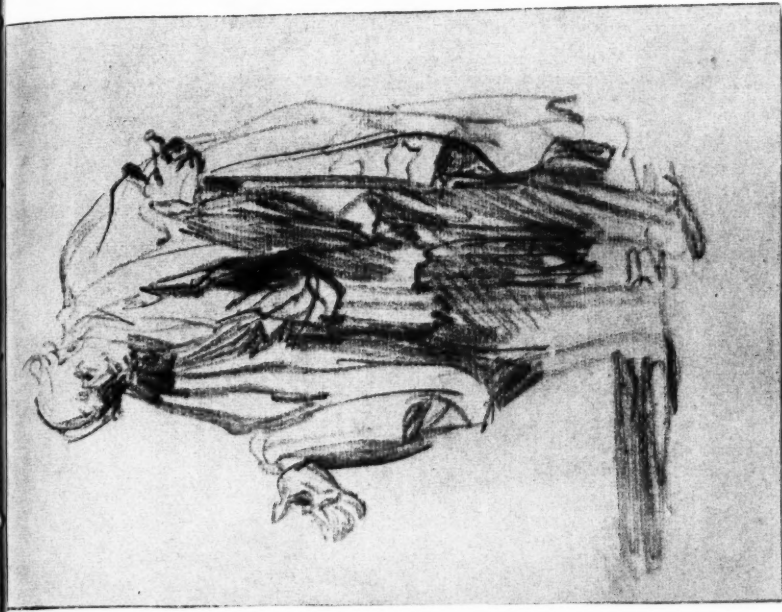
7. Rembrandt: Self-portrait. The Hague, Royal Gallery.



8. Rembrandt: Self-portrait. London, British Museum.



9. Rembrandt: Sts. Peter and John at the gate of the temple.
Etching.



10. Rembrandt: Study for St. Peter. Dresden, Print Room.



11. A. Dürer: Seated woman with a flower. Berlin, Print Room.



12. Rembrandt: Seated old man. Washington, National Gallery of Art
(Rosenwald Coll.)



13. F. van Mieris: The sick woman. Vienna, Albertina.



14. Rembrandt: Saskia in bed. Munich, Print Room.



15. Rembrandt: Saskia as a bride. Berlin, Print Room.



16. Rembrandt: Studies of a child with a bottle. Munich, Print Room.



17. Rembrandt: Studies of Saskia asleep. New York, Pierpont Morgan Library.



18. Rembrandt: Mother with child on a staircase.
New York, Pierpont Morgan Library.



19. Rembrandt: Woman at a window. Paris, Louvre.



20. Rembrandt: Woman asleep. London, British Museum.



21. Rembrandt: Study for a Susanna. Berlin, Print Room.



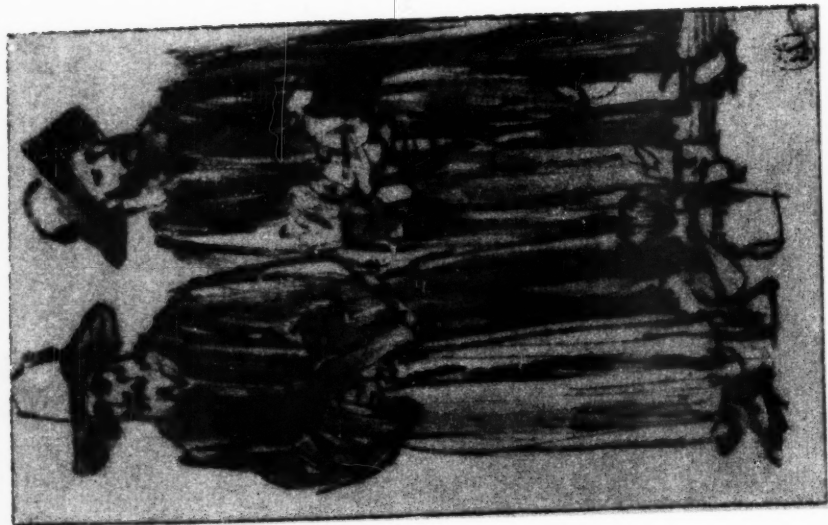
22. Rembrandt: Studies of beggars. Berlin, Print Room.



23. Rembrandt: Baby learning to walk. London, British Museum.

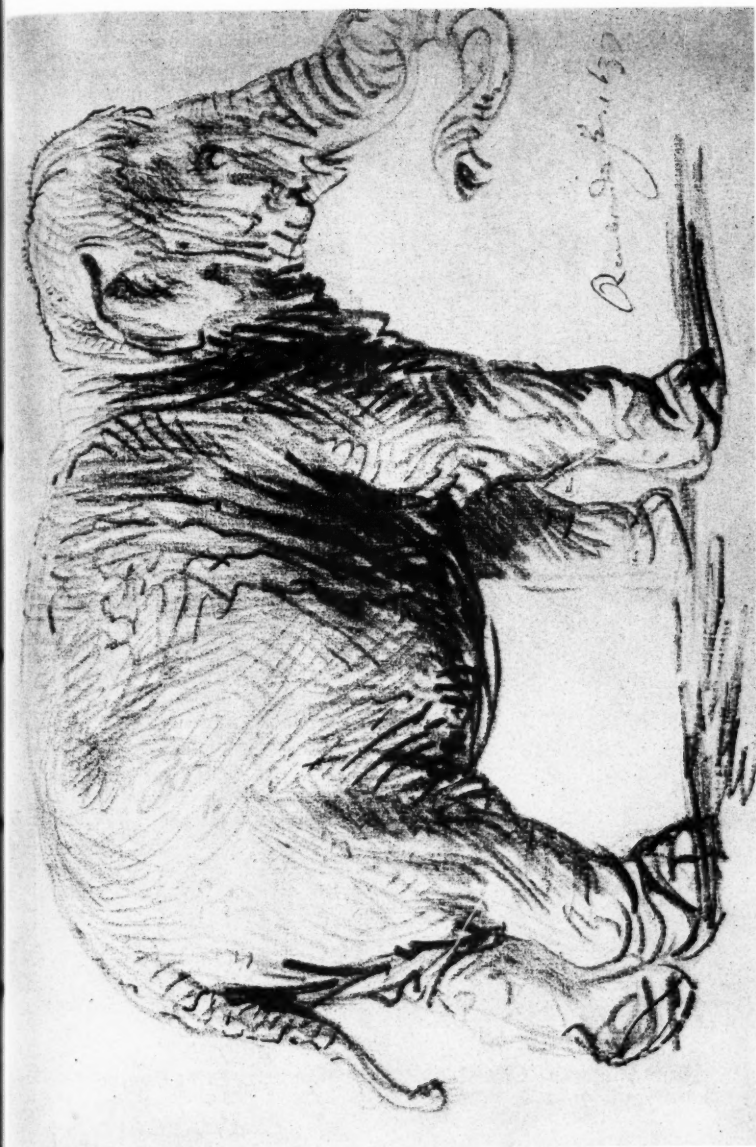


24. Rembrandt: Beggar woman and child. Cambridge,
Paul J. Sachs Coll.

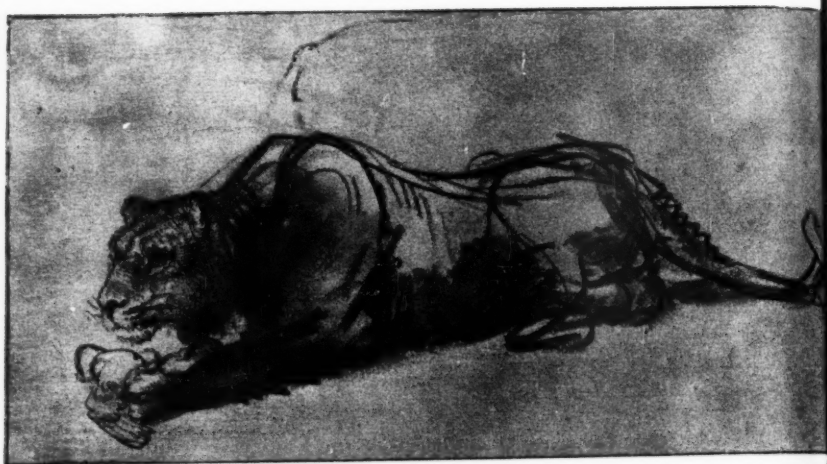


25. Rembrandt: Two Jews. Formerly Dresden,
Coll. Friedrich August II.

24* Rembrandt. Elephant. Cambrige, Mass. Coll. J. Sachs Coll.
25* Rembrandt. Elephant. Cambrige, Mass. Coll. J. Sachs Coll.
26* Rembrandt. Elephant. Cambrige, Mass. Coll. J. Sachs Coll.



26. Rembrandt: Elephant. Vienna, Albertina.



27. Rembrandt: Lioness with prey. London, British Museum.



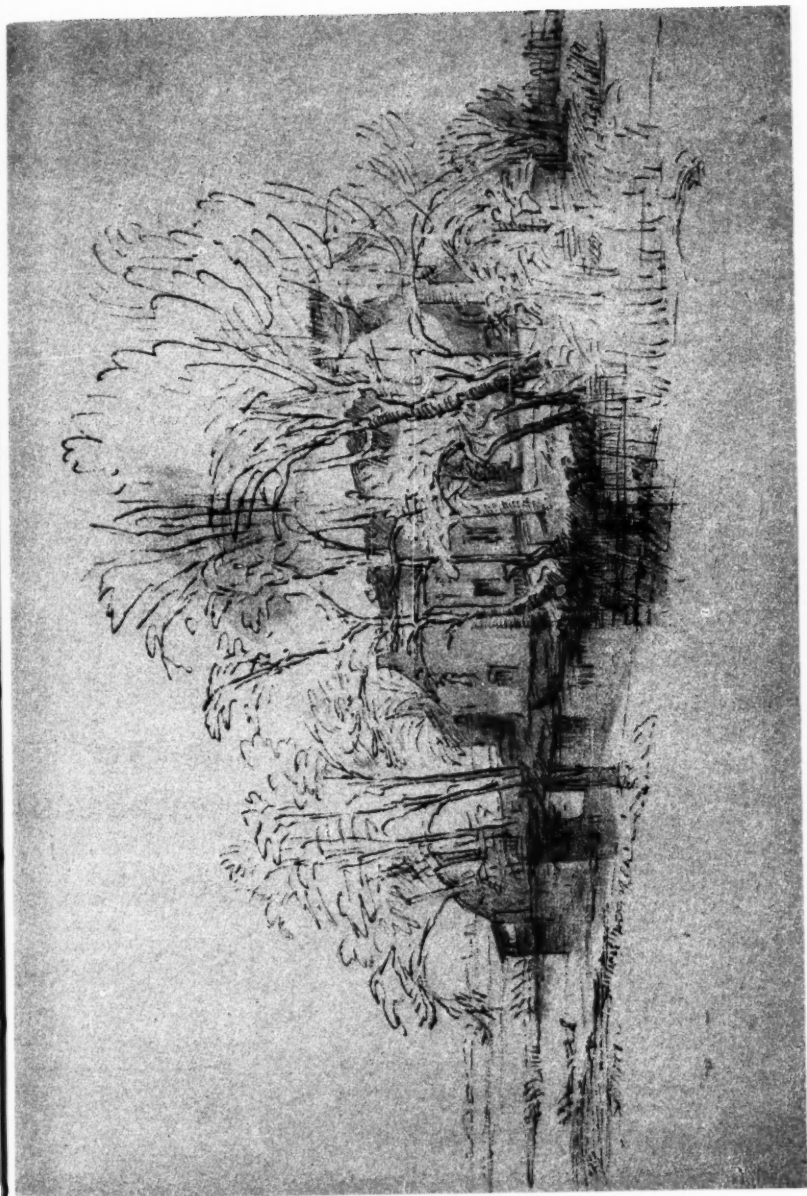
28. Rembrandt: Crouching lion. Amsterdam, Print Room.



29. Rembrandt: Daniel in the lions' den. Amsterdam, Print Room.

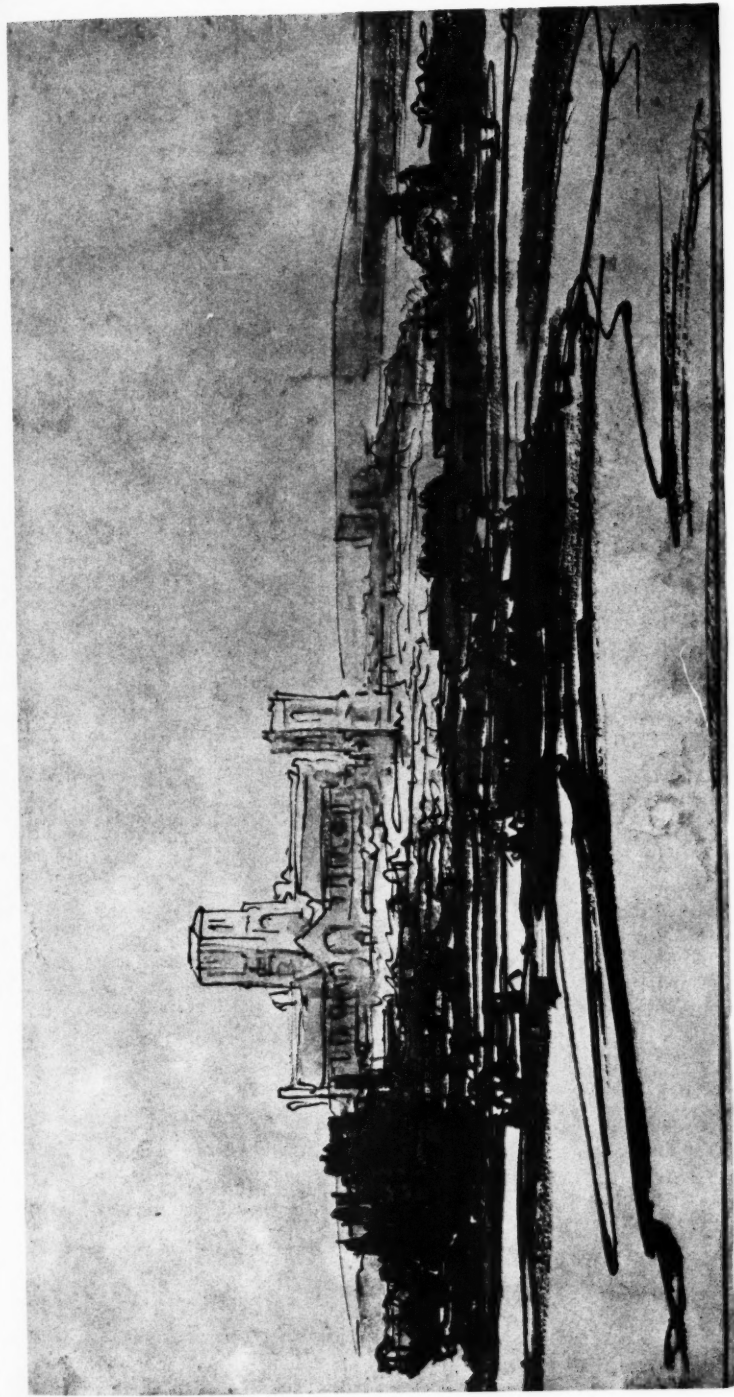


30. Rembrandt: Stormy landscape. Vienna, Albertina.





32. Rembrandt: Cottages among trees. Berlin, Print Room.



33. Rembrandt: View of London with Old St. Paul's. Berlin, Print Room.



34. Rembrandt: Christ in the house of Mary and Martha. Haarlem, Teyler Museum.



35. Rembrandt: Christ healing a sick person. Berlin, Print Room.



36. Rembrandt: Jacob's dream. Paris, Louvre.



37. F. Bol: Jacob's dream. Besançon, Museum.



38. Rembrandt: St. Peter's prayer before the raising of Tabitha.
Bayonne, Musée Bonnat.



39. Rembrandt, copy: Lamentation. Stockholm, Print Room.



40. Rembrandt: Lamentation. Formerly Kassel, Habich Coll.



41. Rembrandt, forgery: Adoration of the Magi. Munich, Print Room.



42. Rembrandt: Arrest of Christ. Stockholm, Print Room.



43. Rembrandt: Self-portrait in studio attire. Amsterdam, Rembrandthuis.

Records of Meetings

13 April 1955 — Stated Meeting

The One Thousand Three Hundred and Eighty-Second Meeting of the Academy convened at its House on 13 April 1955, and was called to order by President Burchard at 8.15 P.M.

There were present 59 Fellows and 76 guests.

The records of the meeting of 9 March were read and approved.

Upon recommendation by the Council it was voted that the assessment for the fiscal year beginning 1 April 1955 be \$15.00 for Resident Fellows and \$5.00 for non-resident Fellows.

Upon motion by the Council it was voted that the following appropriations be made for the fiscal year beginning 1 April 1955.

A. From the General Funds a total of \$36,730.

1. Salaries, Pensions, and Annuities	\$17,000
2. General Office and Meetings Expense	7,100
3. House Maintenance	10,330
4. President's Expense	500
5. Treasurer's Expense	1,000
6. International Relations Committee	500
7. School Science Committee	300

B. From the Restricted Funds, up to the total amount of unexpended income available, which, as estimated by the Treasurer, totals \$111,636.68.

1. Amory Fund	\$35,721.11
2. Permanent Science Fund	28,818.43
3. Publication Account	8,325.73
4. Publication Exchange Fund	6,284.00
5. Rumford Fund	28,714.02
6. Warren Fund	3,773.39

The Secretary announced that the Council at its meeting this afternoon had authorized, upon recommendation by the Rumford Committee, a grant of \$200 from the Rumford Fund to Mr. William A. Jackson of the Harvard University Library in support of the publication of a paper on a collection of drawings made by Count Rumford, written by Professor Sanborn C. Brown, of Massa-

chusetts Institute of Technology, and to be published in the *Harvard Library Bulletin*.

The President reported that committees had been appointed to secure new quarters for the Academy. Arrangements have been made for meetings next year in the auditorium of the Boston Museum of Science, and arrangements are being made for temporary office quarters at 87 Mount Vernon Street with the Colonial Society of Massachusetts. A committee to consider permanent quarters for the Academy has been appointed as follows: Messrs. Shapley (Chairman), Adams, Belluschi, Burchard, Land, Whitehill, and Edwin B. Wilson. This committee is to study the long-range program of the Academy and relate the selection of permanent quarters thereto. The President reported that many feel that the Academy's House should be more accessible to the center of gravity of the resident Fellows, and that a location near Harvard Square had been advocated. He indicated that possibly there was someone who would like to donate a house in a suitable location.

The following Fellows were introduced: Linus C. Pauling (I:3), and Nils Y. Wessell (III:5).

The President announced that in the exhibit case in the lobby were 18th and 19th century publications and manuscripts from the Academy's collection, representative of the early work in establishing vaccination for smallpox.

The following communication was presented:

John F. Enders, John R. Paul, and Thomas Francis, Jr.: *Poliomyelitis: the Virus, Its Dissemination and Methods of Immunization*.

The President introduced Mr. Shapley who expressed the Academy's sentiments on its last meeting in its House, donated by the Agassiz family, at 28 Newbury Street. Mr. Shapley's remarks, which are printed in this issue on pages 110-112, under the title "A Farewell to the Academy House on Newbury Street," contain an admirable statement of his thoughts on the functions of the Academy.

The meeting was dissolved at 10.42 P.M.

11 May 1955 — Annual Meeting

The One Thousand Three Hundred and Eighty-Third Meeting of the Academy was convened after dinner in the Faculty Club of the Massachusetts Institute of Technology on 11 May 1955, and was called to order by the President at 7.30 P.M.

There were present ninety-seven Fellows and seventy-three guests. It is estimated that at the communication following the Annual Business Meeting an additional sixteen Fellows and twenty-eight guests were present.

The records of the meeting of 13 April were read and approved.

The Secretary read the names of the members whose deaths were reported during the year, and the meeting stood to pay them honor. (The Secretary's report on the membership is given below.)

The Secretary reported that the Council this afternoon had voted to make two grants totaling \$1,000 from the Warren Fund.

The Secretary reported the recommendations of the Council for amending the Statutes. In lieu of having these read, it was the sense of the meeting that they should be distributed in print before the next meeting of the Academy.

The Secretary reported that the Council had this afternoon approved awarding seven prizes of \$3,500 each from the Amory Fund for the septennium ending 10 November 1954. (The full citations are given in the Report of the Amory Committee below.)

Upon recommendation of the Council sixty-nine new Fellows and four Foreign Honorary Members were elected, as listed below in the Report of New Members Elected.

The President reported on the sale of the Academy's House at 28 Newbury Street. The papers were passed on 2 May. Mr. Shapley, Chairman of the Committee on Quarters for the Academy, reported that arrangements had been made for meetings to be held in the Morse Auditorium of the Boston Museum of Science, the Kresge Auditorium of the Massachusetts Institute of Technology, and other places during the coming year. He reported that office quarters were being sought in Cambridge.

On recommendation by the Council, it was voted to appropriate up to \$2,500 for the celebration of the 250th birthday anniversary of Benjamin Franklin.

It was voted to elect the Officers and Standing Committees as proposed by the Nominating Committee. These are reported in full below under Officers and Committeemen Elected.

The Secretary read the following resolution made by Mr. Ralph Freeman and passed by the Council this afternoon.

RESOLUTION OF THE COUNCIL

Horace Sayford Ford became Treasurer of the American Academy of Arts and Sciences on 11 May 1938. The following period has been one of remarkable improvement in the Academy's financial position. Its capital and income have increased manifold. Though inflation and the sale of assets contributed to this expansion, it was in no small part attributable to wise investment management. During these years of growth, Mr. Ford has been our financial pilot. He has brought to bear upon our problems a keen mind and a sound judgment nurtured through long experience in handling institutional funds. He has now decided to retire from the office of Treasurer and the Fellows of the Academy feel impelled to give special recognition to his distinguished service. It is a happy circumstance that at this meeting we are the guests of the Massachusetts Institute of Technology, which has benefited from the financial counsel of Mr. Ford for the past forty-four years.

The increase in our resources during Mr. Ford's term of office as Treasurer of the Academy is not attributable to any curtailment of our activities. Indeed the past seventeen years have been marked by expanding operations. Mr. Ford has actively supported the development of conferences and the other new projects we have undertaken and the improvements made in our house at 28 Newbury Street. He has always been ready to give help and encouragement to the Officers, the Council, and the various committees. He has been a friendly and genial colleague whose companionship has enriched our social gatherings. It is gratifying to us that he will continue to serve as a member of the Finance Committee, for we shall be faced with many important decisions during the next few years.

On the occasion of his retirement as Treasurer, the Fellows of the Academy extend their thanks to Horace Ford, with the hope that he will long continue to give them the benefit of his guidance and inspiration. They hereby resolve that these expressions of esteem and gratitude be inscribed in the minutes of this meeting.

The Treasurer was greeted with applause as he came forward to make his last Annual Report.

Other Annual Reports were received. They are all printed below.

The annual business was concluded at 8.00 P.M., and the meeting recessed to the new Kresge Auditorium of the Massachusetts Institute of Technology, designed by Eero Saarinen of Class IV, Section 4 of the Academy.

The following communication was presented:

Lionel Trilling: Sigmund Freud and the Crisis in Our Culture

The meeting was dissolved at 9.50 P.M.

Report of the Secretary on the Status of the Membership

1954-1955

I regret to have to report the following deaths: Twenty-eight Fellows and five Fellows Emeriti—Charles Francis Adams (III:5), Warder Clyde Allee (II:3), Oswald Theodore Avery (II:5), Liberty Hyde Bailey (II:2), Charles Foster Batchelder (II:3), Albert Francis Blakelee (FE II:2), Campbell Bonner (IV:3), Carl Darling Buck (IV:3), George Ashley Campbell (I:2), Robert Peter Tristram Coffin (IV:4), Karl Taylor Compton (I:2), Henry Crew (I:2), Wallace Brett Donham (III:2), George Harold Edgell (IV:4), Irwin Edman (IV:1), William Lloyd Evans (FE I:3), Augustus Noble Hand (III:4), Raymond Dexter Havens (IV:3), John Charles Hubbard (I:2), Ernest Felix Langley (FE IV:3), Theodore Lyman (I:2), Charles Donagh Maginnis (IV:4), Lionel Simeon Marks (I:6), Boris Mirkine-Guetzevitch (III:3), Edward Mueller (I:3), Charles Palache (FE I:5), George Howard Parker (II:3), George James Peirce (II:2), James Stevens Simmons (II:5), Willard Learoyd Sperry (FE IV:1), Herman Augustus Spoehr (II:1), Lewis John Stadler (II:2), Alfred Marston Tozzer (IV:2). Six Foreign Honorary Members—Paul Claudel (FHM III:5), Albert Einstein (FHM I:2), Arthur Keith (FHM II:3), M. Emmanuel de Margerie (FHM II:1), Paul Mazon (FHM IV:3), Charles Rist (FHM III:2).

Six Fellows have been classed as Emeriti: Bancroft Beatley (III:5), Charles Harold Berry (I:6), Helen Maud Cam (IV:2), David Cheever (II:5), Clyde Orval Ruggles (III:2), William Thomson (IV:3).

Four Fellows have resigned: Fuller Albright (II:5), Glennon Gilboy (I:6), Charles Southward Singleton (IV:3), Hsue-Shen Tsien (I:6).

In May, 1954, eighty-five Fellows and eight Foreign Honorary Members were elected to the Academy; all except one accepted election.

The roll now includes 1060 Fellows, 57 Fellows Emeriti, and 144 Foreign Honorary Members (exclusive of those elected tonight).

WILLIAM C. GREENE, *Secretary*

New Members Elected 11 May 1955

FELLOWS

Total elected, 69

CLASS I — MATHEMATICAL AND PHYSICAL SCIENCES — 21

SECTION 1 — *Mathematics* — 2

Hilda Geiringer	Wheaton College, Norton, Mass.
Kenkichi Iwasawa	Massachusetts Institute of Technology, Cambridge, Mass.

SECTION 2 — *Physics* — 4

Gladys Amelia Anslow	Smith College, Northampton, Mass.
Paul Peter Ewald	Polytechnic Institute of Brooklyn, Brooklyn, N. Y.
Francis Lee Friedman	Massachusetts Institute of Technology, Cambridge, Mass.
Robert Clark Jones	Polaroid Corporation, Cambridge, Mass.

SECTION 3 — *Chemistry* — 5

Elkan Rogers Blout	Polaroid Corporation, Cambridge, Mass.
David Newton Hume	Massachusetts Institute of Technology, Cambridge, Mass.
Leonard Kollender Nash	Harvard University, Cambridge, Mass.
Lucy Weston Pickett	Mount Holyoke College, South Hadley, Mass.
Lockhart Burgess Rogers	Massachusetts Institute of Technology, Cambridge, Mass.

SECTION 4 — *Astronomy* — 3

Gerald Maurice Clemence	Naval Observatory, Washington, D. C.
John Peter Hagen	Naval Research Laboratory, Washington, D. C.
Bengt Georg Daniel Stromgren	Yerkes Observatory, Williams Bay, Wisconsin

SECTION 5 — *Earth Sciences* — 2

James Murdoch Austin	Massachusetts Institute of Technology, Cambridge, Mass.
Bernhard Kummel	Harvard University, Cambridge, Mass.

SECTION 6 — *Engineering Sciences and Technologies* — 5

Daniel Charles Drucker	Brown University, Providence, R. I.
Ernst Adolph Guillemin	Massachusetts Institute of Technology, Cambridge, Mass.
Joseph Kaye	Massachusetts Institute of Technology, Cambridge, Mass.
Herman Paul Meissner	Massachusetts Institute of Technology, Cambridge, Mass.
Walter Alter Rosenblith	Massachusetts Institute of Technology, Cambridge, Mass.

CLASS II — BIOLOGICAL SCIENCES — 17

SECTION 1 — *Biophysics and Biochemistry* — 4

Konrad Emil Bloch	Harvard University, Cambridge, Mass.
Britton Chance	University of Pennsylvania, Philadelphia, Pa.
Carl George Niemann	California Institute of Technology, Pasadena, Cal.
Dilworth Wayne Woolley	Rockefeller Institute, New York, N. Y.

SECTION 2 — *Botany and Bacteriology* — 2

John Robert Raper	Harvard University, Cambridge, Mass.
Thomas Huckle Weller	Harvard Medical School, Boston, Mass.

SECTION 3 — *Zoology* — 3

Don Wayne Fawcett	Harvard Medical School, Boston, Mass.
William White Howells	Harvard University, Cambridge, Mass.
Oscar Emil Schotté	Amherst College, Amherst, Mass.

SECTION 4 — *Physiology and Experimental Psychology* — 2

Ralph Waldo Gerard	University of Illinois, Urbana, Ill.
Carl Frederic Schmidt	University of Pennsylvania, Philadelphia, Pa.

SECTION 5 — *Medicine* — 6

Raymond DeLacy Adams	Harvard Medical School, Boston, Mass.
Henry Knowles Beecher	Harvard Medical School, Boston, Mass.
Alfred Blalock	Johns Hopkins University, Baltimore, Md.
Dana Lyda Farnsworth	Harvard University, Cambridge, Mass.
Thomas Hale Ham	Western Reserve University, Cleveland, Ohio
Albert Bruce Sabin	Children's Hospital Research Foundation, Cincinnati, Ohio

CLASS III — SOCIAL ARTS AND SCIENCES — 18

SECTION 1 — *Social Relations* — 2

Cora Alice DuBois	Harvard University, Cambridge, Mass.
David Riesman	University of Chicago, Chicago, Ill.

SECTION 2 — *Economics* — 5

Arthur Frank Burns	Economic Adviser to the President, Washington, D. C.
George Nikolaus Halm	Tufts College, Medford, Mass.
Simon Smith Kuznets	Johns Hopkins University, Baltimore, Md.
Eli Shapiro	Massachusetts Institute of Technology, Cambridge, Mass.
Willard Long Thorp	Amherst College, Amherst, Mass.

SECTION 3 — *Political Science* — 3

Samuel Hutchison Beer	Harvard University, Cambridge, Mass.
Rupert Emerson	Harvard University, Cambridge, Mass.
Valdimer Orland Key, Jr.	Harvard University, Cambridge, Mass.

SECTION 4 — *Law* — 3

David Farquhar Cavers	Harvard University, Cambridge, Mass.
Archibald Cox	Harvard University, Cambridge, Mass.
Arthur Eugene Sutherland	Harvard University, Cambridge, Mass.

SECTION 5 — *Administration and Affairs* — 5

Dean Gooderham Acheson	Covington and Burling, Washington, D. C.
John Fitzgerald Kennedy	U. S. Senator from Massachusetts, Brookline, Mass.
Wilfred Stanley Lake	Northeastern University, Boston, Mass.
Roy Edward Larsen	Time, Incorporated, New York, N. Y.
Richard Scott Perkin	Perkin-Elmer Corporation, Norwalk, Conn.

CLASS IV — HUMANITIES — 13

SECTION 1 — *Philosophy and Theology* — 1

Paul Oskar Kristeller	Columbia University, New York, N. Y.
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SECTION 2 — *History and Archaeology* — 5

Marie Boas	Brandeis University, Waltham, Mass.
Francis Dvornik	Harvard University, Cambridge, Mass.
Edward Chase Kirkland	Bowdoin College, Brunswick, Maine
Arthur Meier Schlesinger, Jr.	Harvard University, Cambridge, Mass.
William Stevenson Smith	Museum of Fine Arts, Boston, Mass.

SECTION 3 — *Philology and Criticism* — 3

Gordon Keith Chalmers	Kenyon College, Gambier, Ohio
Marjorie Hope Nicolson	Columbia University, New York, N. Y.
Benjamin Rowland, Jr.	Harvard University, Cambridge, Mass.

SECTION 4 — *Fine Arts and Belles Lettres* — 4

John Howard Benson	Newport, R. I.
Gardner Cox	Cambridge, Mass.
Philip Hofer	Harvard College Library, Cambridge, Mass.
Edmund Wilson	Wellfleet, Mass.

FOREIGN HONORARY MEMBERS

Total elected, 4

CLASS I — MATHEMATICAL AND PHYSICAL SCIENCES

SECTION 4 — *Astronomy*

Alfred Charles Bernard Lovell	University of Manchester, Manchester, England
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Records of Meetings

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CLASS II — BIOLOGICAL SCIENCES

SECTION 3 — *Zoology*

John Axel Mauritz Runnström

Wenner-Grens Institute for Experimental Biology, Stockholm, Sweden

CLASS III — SOCIAL ARTS AND SCIENCES

SECTION 1 — *Social Relations*

Alfred Weber

Heidelberg University, Heidelberg, Germany

CLASS IV — HUMANITIES

SECTION 4 — *Fine Arts and Belles Lettres*

Henry Moore

Much Hadham, Herts, England

Officers and Committeemen Elected 11 May 1955

Officers

To serve for one year

John E. Burchard, *President*

Edward L. Bowles, *Vice-President of Class I*

Hudson Hoagland, *Vice-President of Class II*

David F. Edwards, *Vice-President of Class III*

Robert Ulich, *Vice-President of Class IV*

William C. Greene, *Secretary*

Thomas B. Adams, *Treasurer*

Walter M. Whitehill, *Editor and Librarian*

Councillors

To serve for four years

George Scatchard, *I:3*

Philippe E. LeCorbeiller, *I:6*

Ralph H. Wetmore, *II:2*

Karl W. Deutsch, *III:3*

Robert T. Paine, Jr., *IV:4*

Permanent Science Fund

Committee

To serve for three years

Harlow Shapley, *Chairman*

Frank M. Carpenter

Jacob Fine

House Committee

To serve for three years

David McCord

Rumford Committee

To serve for three years

Sanborn C. Brown, *Chairman*

William J. Crozier

Committee on Membership

To serve for two years

John H. Van Vleck, *Class I*
Edward S. Castle, *Class II*
Erwin N. Griswold, *Class III*
Pietro Belluschi, *Class IV*

Committee on Meetings

To serve for two years

Norman J. Padelford, *Class III*
John O. Brew, *Class IV*

Finance Committee

To serve for two years

Horace S. Ford
Henry L. Shattuck

Auditing Committee

To serve for two years

Keyes DeWitt Metcalf

Committee on Publication

To serve for two years

Erwin D. Canham, *Class III*
Rudolph Ruzicka, *Class IV*

Warren Committee

To serve for three years

Walter G. Whitman, *Chairman*
George B. Kistiakowsky

Amory Prize Committee

To serve for one year

Edwin B. Wilson, *Chairman*
William B. Castle
J. Hartwell Harrison
Roy G. Hoskins
Gregory Pincus
George W. Thorn
George B. Wislocki

Nominating Committee

To serve for three years

Robert B. Lindsay, *Class I*
George C. Shattuck, *Class II*
Clyde K. M. Kluckhohn, *Class III*
Robert E. Moody, *Class IV*
To serve two years as Chairman
Elso S. Barghoorn

Report of the Treasurer

SCHEDULE A

Balance Sheet, 31 March, 1955

Assets

Cash in Banks and on Hand (Schedule E)	\$ 8,783.48
<i>Investments:</i>	
General Fund (Market Value	
\$933,614.19)	\$700,324.22
Rumford Fund (Market Value	
\$118,758.38)	86,132.90
Total Investments (Schedule D)	
(Market Value \$1,052,372.57)	786,457.12
Real Estate, 28 Newbury Street, Boston, Mass.	
(Book Value)	90,000.00
Prepaid Insurance Premiums	685.92
<i>Total</i>	<u><u>\$885,926.52</u></u>

Liabilities

Plant Capital	\$ 90,000.00
<i>Funds* (Schedule G):</i>	
<i>General:</i>	
Securities	\$621,697.85
<i>Rumford:</i>	
Securities	\$86,132.90
Cash	686.39
Total Funds (Schedule G)	86,819.29
Total Funds (Schedule G)	708,517.14
<i>Unexpended Income (Schedule E):</i>	
Securities and Insurance Premiums ..	\$ 79,312.29
Cash	8,097.09
Total Unexpended Income	87,409.38
<i>Total</i>	<u><u>\$885,926.52</u></u>

* Not including principal of Permanent Science Fund, see under Description of Funds.

SCHEDULE B

RECEIPTS FOR THE FISCAL YEAR ENDED 31 MARCH 1955*

Academy, General:

Investment Income

(Schedule D) \$41,231.43

Less: Income to Special

Funds 16,655.90

\$ 24,575.53

House Credits 4,246.59

Assessments and Admission Fees 9,405.00

Overhead Credits 1,140.30

\$ 39,367.42

Mabel S. Agassiz Fund: Investment Income 132.00*Amory Fund Committee: Investment Income* 5,200.80*Kennelly Fund: Investment Income* 145.20*Life Membership Fund* 400.00*National Science Foundation Grants:*

Committee on History of Government

in Science \$ 6,000.00

Committee on Acceptance of Scientific

Theories 12,900.00

18,900.00

Permanent Science Fund:

Boston Safe Deposit and Trust Co.,

Trustee \$ 15,984.86

Investment Income 660.00

16,644.86

Publication Committee:

Investment Income \$ 3,098.04

Sale of Publications 1,197.65

Lake Publications 724.04

5,019.73

Publication Exchange Fund:

Linda Hall Library 1,116.21

Rockefeller Foundation Grant:

Committee on the Unity of Science 5,007.51

Rumford Fund Committee:

Investment Income \$ 6,056.30

Sale of Publications 64.91

Return of Grant 58.71

Climatic Conference Publication 1,076.13

7,256.05

Slavic Civilization Publications 26.47*Totalitarianism Publication* 211.75*Special Endowment Fund: Investment Income* 17.16*Warren Fund Committee: Investment Income* 1,346.40*Total Receipts* \$100,791.56

* Excluding sales of securities.

SCHEDULE C

EXPENDITURES FOR THE FISCAL YEAR ENDED 31 MARCH 1955*

Academy, General:

Salaries and Pensions, etc.	\$ 16,081.86	
General Administration	5,087.31	
House Maintenance	9,390.63	
President's Expense	374.45	
Treasurer's Expense	977.16	
Committee Appropriations:		
School Science	248.26	
International Relations	466.53	
Totalitarianism	1,152.00	\$ 33,778.20

<i>Mabel S. Agassiz Fund: For Meetings</i>	132.00	
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<i>Amory Fund: Expense</i>	386.74	
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<i>Committee on the Unity of Science</i>	4,746.30	
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<i>Committee on History of Government in Science</i>	14,540.79	
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<i>Committee on Acceptance of Scientific Theories</i>	3,726.18	
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Permanent Science Fund:

Awards	\$ 27,114.00	
Expense	1,365.57	28,479.57

Publications Committee:

Bulletin	\$ 703.20	
Proceedings	2,019.95	
Miscellaneous	200.18	2,923.33

Rumford Fund Committee:

Awards	\$ 3,850.00	
Medals	846.20	
Travel	255.00	
Miscellaneous	523.51	5,474.71

<i>Slavic Civilization Publications</i>	5.30	
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<i>Totalitarianism Publication</i>	27.79	
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<i>Warren Fund Committee: Awards</i>	2,878.00	
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<i>Total Expenditures</i>	<u>\$ 97,098.91</u>	
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* Excluding purchases of securities.

Schedule D, Investments, and Schedule E, Cash, are not reproduced here, but are available to Fellows upon request from the Treasurer.

SCHEDULE F

SUMMARY OF OPERATING ACCOUNTS

Account	Balance 31 March 1954	Invest- ment Income	Other Income	Charges Against Income	Balance 31 March 1955
General		\$24,575.53	\$14,791.89	\$39,367.42	.....
Acceptance of Scientific Theories			12,900.00	3,726.18	\$ 9,173.82
Amory Fund	\$25,251.05	5,200.80	.....	386.74	30,065.11
History of Government in Science	8,601.65	.....	6,000.00	14,540.79	60.86
Permanent Science Fund					
Income Account	23,953.14	660.00	15,984.86	28,479.57	12,118.43
Publications — General	924.93	3,098.04	1,197.65	2,923.33	2,297.29
Publications — Lake	2,021.40	.....	724.04	.....	2,745.44
Rockefeller Foundation Grant	3,466.74	.....	5,007.51	4,746.30	3,727.95
Rumford Fund	20,935.68	6,056.30	1,199.75	5,474.71	22,717.02
Slavic Civilization Publication	173.98	.....	26.47	5.30	195.15
Totalitarianism Publication .....	.....	.....	211.75	27.79	183.96
Validation of Scientific Theories	1,778.96	.....	.....	.....	1,778.96
Warren Fund	3,876.99	1,346.40	.....	2,878.00	2,345.39
	<u>\$90,984.52</u>	<u>\$40,937.07</u>	<u>\$58,043.92</u>	<u>\$102,556.13</u>	<u>\$87,409.38</u>
		(Schedule B)			(Schedule E)

SCHEDULE G — FUNDS

	Balance 31 March 1954	Invest- ment Income	Other Receipts*	Charges Against Funds	Balance 31 March 1955
General Funds:					
Regular	\$ 49,848.38	.....	.....	.....	\$ 49,848.38
Life Membership	5,400.00	.....	\$ 400.00	.....	5,800.00
Current Expense	7,936.30	.....	5,589.22	.....	13,525.52
Barbour Fund	5,000.00	.....	.....	.....	5,000.00
Library Sale Fund	288,876.91	.....	.....	.....	288,876.91
Mabel S. Agassiz Fund	2,000.00	\$132.00	.....	\$132.00	2,000.00
Amory Fund	53,759.70	.....	.....	.....	53,759.70
Appleton Fund	17,278.39	.....	.....	.....	17,278.39
Centennial Fund	25,608.77	.....	.....	.....	25,608.77
Publication Exchange Fund ..	15,446.37	.....	1,116.21	.....	16,562.58
Kennelly Fund	2,225.06	145.20	.....	.....	2,370.26
Rumford Fund	86,819.29	.....	.....	.....	86,819.29
Special Endowment Fund	260.06	17.16	.....	.....	277.22
Warren Fund	18,405.16	.....	.....	.....	18,405.16
Investment Reserve Fund ...	97,889.59	.....	28,841.56	4,346.19	122,384.96
Totals	<u>\$676,753.98</u>	<u>\$294.36</u>	<u>\$35,946.99</u>	<u>\$4,478.19</u>	<u>\$708,517.14</u>
		(Schedule B)			(Schedule A)

* Including gains on sales of securities.

DESCRIPTION OF FUNDS

GENERAL FUNDS

Present Balances \$49,848.38 General Fund
5,800.00 Life Membership Fund
13,525.52 Current Expense Fund

Established by various subscriptions and contributions. The income of the first two funds is available for the general purposes and maintenance of the Academy — and both principal and income of the Current Expense Fund are available if needed.

MABEL S. AGASSIZ FUND

Gift of \$2,000, 1940. Income for expenses of Academy meetings.

FRANCIS AMORY FUND

Bequest, 1912. Present balance, \$53,759.70. For the purpose of establishing a Septennial Prize and a gold medal to encourage the invention and discovery of measures for the relief of maladies peculiar to the bladder and the various organs connected with it. The bequest directed that public notice should be given of the nature and design of the Fund and contributions should be solicited in aid of it — also, that no award of the income be made until twenty-one years after the date of Mr. Amory's death (i.e. 1933). Four awards were made in 1940 and six awards in 1947.

APPLETON FUND

Present balance, \$17,278.39. Established in 1854. The Trustees under the will of Samuel Appleton turned over to the Academy certain manufacturing stocks, of the par value of \$10,000, for the purpose of constituting "a fund, the income of which is to be applied to the publication of the transactions of the said Society."

THOMAS BARBOUR FUND

Bequest, 1947, \$5,000. Unrestricted as to principal and income.

CENTENNIAL PUBLICATION FUND

Present balance, \$25,608.77. Established in 1880 by gift of \$1,000 from Dr. E. B. Cotting, a Fellow. Balance from subscriptions solicited by the Centennial Committee. Income is applied to publishing the transactions of the Academy.

ARTHUR E. KENNELLY FUND

Bequest, 1939. Present balance, \$2,370.26. Unrestricted as to principal and income.

LIBRARY SALE FUND

Sale Price, \$320,000. May, 1946. Proceeds for general purposes of the Academy. Present balance, \$288,876.91.

PERMANENT SCIENCE FUND

Balance, 31 December 1954, \$383,249.13. Fund established in September, 1928, by agreement and declaration of trust of the Boston Safe Deposit and Trust Company, acting as Trustee. Principal of Fund is held and invested by the Trustee and the annual income paid over to the Academy, semi-annually, on request.

PERMANENT SCIENCE FUND (*Income Account*)

Balance, 31 March 1955, \$12,118.43. Income of the Permanent Science Fund (above) accumulated and held apart. Available for awards for scientific research on recommendation of the Committee on the Permanent Science Fund of the Academy.

PUBLICATION EXCHANGE FUND

Balance, 31 March, 1955, \$16,562.58.

RUMFORD FUND

Gift of Count Rumford, 1796, \$5,000 in three per cent stock of the United States. Present balance, \$86,819.29. Part of the income is applied ordinarily every second year as a premium "to the author of the most important discovery or useful improvement which shall be made or published in writing during the preceding two years on heat and light."

In 1832, the Supreme Judicial Court of Massachusetts decreed that the balance of income might be used for the purchase of books, papers, philosophical apparatus, making publications or procuring lecturers, experiments and investigations, thereby carrying out the general intent and purpose of Count Rumford.

SPECIAL ENDOWMENT FUND

Gift, 1949, \$200. For future development of the Academy. Balance, 31 March 1955, \$277.22.

C. M. WARREN FUND

Bequest of Cyrus M. Warren, 1891. Present balance, \$18,405.16. The principal is to be held at interest and the income is to be applied toward the encouragement and advancement of research in the science or field of chemistry.

HORACE S. FORD, *Treasurer*

Report of the Amory Committee

The Amory Committee has met four times during the academic year ending 11 May 1955, on 28 September, 12 January, 9 February, and 11 May, and recommends the granting of seven prizes of \$3,500 each as the Amory Prizes for the septennium ending 10 November 1954, as follows:

(1) To **FREDERIC E. B. FOLEY**, St. Paul, Minnesota, for outstanding inventive and surgical genius productive of numerous contrivances, instruments and operations of great value in the treatment of those afflicted with urological disease.

(2) To **CHOH HAO LI**, University of California, Berkeley, California, for his work on the relation of the anterior pituitary hormones to the maintenance and functioning of the human reproductive organs.

(3) To **THADDEUS R. R. MANN**, Molteno Institute, University of Cambridge, Cambridge, England, for his basic contributions to the rapidly expanding field of the biochemistry of reproductive functions, providing basic data, stimulating research and clinical progress.

(4) To **TERENCE J. MILLIN**, The Queen's Gate Clinic, London, England, for his valuable contribution to surgery by devising and developing the technique of retropubic prostatectomy for benign hyperplasia of the prostate and for adapting this technique to radical prostatectomy and vesiculectomy for the cure of cancer of the prostate.

(5) To **WARREN O. NELSON**, State University of Iowa, College of Medicine, Iowa City, Iowa, for his penetrating studies of the structural relationships of the male sex organs and of the factors that determine the functional activities of the various components thereof.

(6) To **FREDERICK J. WALLACE**, American Cystoscope Makers, Inc., New York, N. Y., for his cooperation with the urological profession in developing diagnostic and therapeutic instruments which have contributed materially to the technical advances in this specialty.

(7) To **LAWSON WILKINS**, Johns Hopkins University, Baltimore, Maryland, in recognition of his significant contributions to fundamental knowledge of growth and development of secondary sex characteristics in man and his brilliant application of adrenal cortical hormone to their management and treatment.

The Committee further recommends that the awards be presented at the Academy meeting in October 1955 and that the communication at that time be given by Dr. Terence J. Millin of London.

EDWIN B. WILSON, *Chairman*

Report of the House Committee 1954-55

The Academy met in the House seven times during the year, and there were 18 meetings of various committees under the auspices of the Academy. The average attendance for the seven Academy meetings was 135. A total of 36 other scientific or cultural guest organizations held 165 meetings in the House, with an average attendance of 76. It is estimated that the total attendance at meetings and exhibits for the year was about 15,900.

Below are listed the titles of the exhibits in the lobby and the period during which they were displayed. It is estimated that 2,080 persons entered the House solely to view the exhibits.

Study of Congenital Malformations by Clinical, Epidemiological and Experimental Techniques	12 May to 8 June
Photographic Reproductions of the Murals of Horyuji Temple	12 May to 29 August
Mediaeval Cathedrals (Museum of Fine Arts, Boston)	31 August to 29 September
New England Coastal Steamships by Antonio Jacobsen (Peabody Museum of Salem)	11 October to 5 November
Pre-Atomic Arms (Peabody Museum of Salem)	8 November to 28 December
Solar Corona	11 January to 28 January
Photographic Impressions of La Belle France by Samuel Chamberlain	31 January to 25 February
The Pageant of History in Northern California by Ansel Adams	1 March to 18 March
Paintings by students of Boston YWCA Workshops	18 March to 10 May

The costs of maintaining and operating the House are given in the table below:

<i>Expenditures</i>	<i>1953-1954</i>	<i>1954-1955</i>
Custodian, Assistance, Pensions	\$ 4,293.69	\$ 4,363.00
Coal	1,606.41	1,793.00
Electricity	1,151.06	1,216.00
Elevator	523.64	593.00
Water	25.50	26.00
Equipment	21.19	270.00
Supplies	731.57	618.00
Alterations and Repairs	4,346.01	557.00
Fire Insurance	545.28	502.00
Miscellaneous	117.65	52.00
Appropriations Total (including pensions)	\$13,362.00	\$ 9,990.00
	13,525.00	10,090.00
Unexpended	\$ 163.00	\$ 100.00

The only non-routine expenditure for the maintenance of the House was \$332.76 for installing a sump pump to drain the elevator well automatically when it floods.

During the past year the organizations holding meetings in the House contributed \$3,453.72 towards maintenance expenses as against \$3,640.76 last year. The Committee on International Scientific Publication discontinued use of the large office space on the fourth floor as of 1 May 1954, except for storage of supplies and equipment. This room was occupied by the World Affairs Council from 1 August 1954, to 31 March 1955. The smaller office on the fourth floor has been occupied since the beginning of the fall of 1954 by Dr. Frank in carrying on the Academy's project: Reasons for the Acceptance of Scientific Theories. Space for storing books in the library-stack wing has been provided, as previously, for the Boston Museum of Science, the Boston Authors Club, and the Boston Medical Library.

At its meeting on 9 March 1955, the Council voted to sell the House of the Academy. On 2 May at 11:30 A.M. title was passed to Helena Rubinstein, Inc., and the Academy received \$215,000, the balance of which after covering expenses is to be carried in an account of the Academy to be known as the Agassiz Fund.

THOMAS K. SHERWOOD, *Chairman*

Report of the Permanent Science Fund Committee

Under the Chairmanship of Dr. Oncley the Committee met on 7 October to consider 13 applications requesting a total of \$28,874.75 of which 6 applications totaling \$7,030 were recommended by the Committee. These six were approved by the Council 13 October 1954.

On 2 March the Committee reviewed 44 applications requesting a total of \$56,072 and recommended 15 grants totaling \$12,424, which were approved by the Council at its meeting on 9 March 1955.

The Committee, having been charged with the duty of recommending to the Council recipients for the Academy Research Grants in New England, which the Academy is distributing for the American Association for the Advancement of Science, recommended one grant of \$200 to Carroll E. Wood, Jr., Associate Curator, Arnold Arboretum, Jamaica Plain 30, Mass., for travel for cytotaxonomic investigations on the hybrid origin of *Drosera anglica*. This was approved by the Council at its meeting on 9 March 1955.

The total amount of grants approved by the Committee and the Council during the year was \$19,654.

A letter was developed by the Committee asking previous grantees for information concerning what was accomplished by the grants given them and for their suggestions concerning the values of the Fund and how its usefulness might be increased. This was sent to about 290 grantees for whom an address could be found, out of a total of 370 grants which were given during the first 25 years of the Fund. In many cases an individual received more than one grant. Replies were received from over 160 grantees. The replies were most helpful, and have been studied as to remarks pertinent to 1) consideration by the Committee in developing policy concerning management of the Fund, and to 2) developing publicity for the Fund. There was almost unanimous agreement with the policy of favoring the young scientist, and the smaller institutions. Questions were raised as to the size of grant which should be considered, but most replies indicated that the present level averaging about \$800-\$1,000 per grant was realistic today. Many investigators felt that their aid from the Permanent Science Fund was of great significance in the development of their research, and had materially influenced their careers.

Upon recommendation by the Permanent Science Fund Committee the Council at its meeting on 13 April voted "to authorize the President to appoint a special committee to work toward the enlargement of the principal of the Permanent Science Fund or other funds for the Academy's support of research."

Grants Approved by the Council 13 October 1954

- (1) To Joseph H. Boyer, Assistant Professor in Chemistry, Tulane University, New Orleans, Louisiana, for a study of azlactones from the reaction of aldehydes on azides, \$1,500.
- (2) To Richard S. MacNeish, Anthropologist, National Museum of Canada, Ottawa, Ontario, Canada, for a study of the development of agriculture and concomitant development of 'high culture' in south-west Tamaulipas, Mexico, \$900.
- (3) To Richard S. Miller, Instructor, Harvard University, Cambridge, Mass., for the study of population growth and competition in *Drosophila*, \$850.
- (4) To Robert L. Reid, Lecturer, Canterbury College, University of New Zealand, Christchurch, New Zealand, for quantitative studies of the behaviour of several species of organisms, particularly concerning

the relationships between motivational conditions and the activation of habits, \$330.

(5) To Moddie D. Taylor, Associate Professor, Howard University, Washington, D. C., for a study of the vapor phase dissociation of some carboxylic acids, III: trifluoroacetic acids, \$1,450.

(6) To H. Bradford Washburn, Director, Museum of Science, Boston, Mass., for Mount McKinley (Alaska) Map, \$2,000.

Grants Approved by the Council 9 March 1955

(1) To Warren O. Ault, Professor of History, Boston University, Boston, Mass., for travel and microfilms for a study of village communities of Tudor and pre-Tudor England, \$600.

(2) To James R. Beerbower, Instructor, Department of Geology, Lafayette College, Easton, Pennsylvania, for travel expenses in a study of paleontology and paleoecology of the Dunkard Group, latest Paleozoic of the Eastern United States, \$600.

(3) To Clarence F. Dineen and Paul S. Stokely, Assistant Professors of Biology, University of Notre Dame, Notre Dame, Indiana, for supplies, assistance and manuscript preparation in a phylogenetic study of centrarchid fishes based on their ecology and a statistical analysis of osteological variations, \$800.

(4) To Howard E. Evans, Associate Professor, Department of Entomology, Cornell University, Ithaca, New York, to cover costs of assistance to make microscope preparations and drawings for a taxonomic study of the larvae of digger wasps (Hymenoptera, Sphecidae), \$500.

(5) To Felix Friedberg, Assistant Professor, Howard University Medical School, Washington, D.C., for C¹⁴ malonic acid ester for a study of enzymic dissimilation of certain amino acids: 1. Hydroxyproline, \$1,000.

(6) To William G. Guindon, Assistant Professor, Boston College, Chestnut Hill, Mass., for equipment for the study of gamma-gamma angular correlation study, \$1,519.

(7) To Najib Abu Haydar, Peter Bent Brigham Hospital, 721 Huntington Avenue, Boston, Mass., for laboratory equipment and assistance for a study of the homeostatic role of the adrenal cortex under the unusual conditions of desert life, \$1,500.

(8) To Gordon E. Hunt, Assistant Professor of Botany, University of Tennessee, Knoxville, Tennessee, for equipment for the isolation and

identification of nitrogen compounds in the root nodules of various legumes, especially the soybean, \$680.

(9) To Benedict J. Jaskoski, Assistant Professor of Biology, Loyola University, Chicago, Illinois, for assistance and other expenses in a study of the relation of food reserves to age, infectivity, and viability of larvae of *Ascaris suum*, \$600.

(10) To Ralph W. Lewis, Professor, Department of Natural Science, Michigan State College, E. Lansing, Michigan, for assistance and materials for a search for facts to test the "balance hypothesis of parasitism," \$1,200.

(11) To Glenn A. Noble, Head, Biological Sciences Department, California State Polytechnic College, San Luis Obispo, California, for assistance and materials for a study in amoebiasis in pigs and man and for assistance for a study of *Paragonimus westermani* (lung fluke), \$625.

(12) To W. Lewis Nobles, Associate Professor Pharmaceutical Chemistry, University of Mississippi, University, Mississippi, for assistance and materials for the synthesis of vinyls of some essential metabolites, \$700.

(13) To Donald D. Ritchie, Associate Professor of Botany, Barnard College, Columbia University, New York, New York, for assistance in a preliminary survey of fungi from the salt waters of Panama, \$700.

(14) To Charles R. Shackford, Research Fellow in Acoustics, Harvard University, Cambridge, Mass., for assistance and materials for an objective study of intonation in ensemble string performance, \$400.

(15) To Harry B. Whittington, Associate Professor of Geology and Curator of Invertebrate Paleontology, Harvard University, Cambridge, Mass., for an assistant to prepare illustrations for publication of a study of silicified middle Ordovician trilobites from Virginia, \$1,000.

J. L. ONCLEY, *Chairman*

Report of the Committee on Publication

The Charter of Incorporation granted to the American Academy of Arts and Sciences by the Massachusetts Legislature on 4 May 1780, after listing many particular instances, summarized the "end and design" of the Academy as "to cultivate every art and science which may tend to advance the interest, honor, dignity, and happiness of a free, independent, and virtuous people." After one hundred and

seventy-five years of increasing specialization, a meeting of the Academy still brings together scholars in such diverse fields of knowledge that one inevitably returns, for the moment at least, to the breadth of interest of the eighteenth century founders. In recent years the stated meetings, as well as various special conferences and symposia, have been planned with the hope of appealing to a wider group than the speakers' fellow specialists. Although some meetings have been more successful than others, there is always the pleasant possibility of taking food and drink with first-rate and agreeable people that would not otherwise cross one's path. However useful these developments may have been for those who have turned up at 28 Newbury Street with some regularity, the *Proceedings* of the Academy as published have conveyed rather too little of this spirit to Fellows living at a distance.

This problem was considered at length during the spring of 1954 by the Publications Committee, consisting of Harlow Shapley, Hudson Hoagland, Thomas J. Wilson and Waldo G. Leland, as well as a special committee under the chairmanship of Howard Mumford Jones that included John E. Burchard, Philipp G. Frank, David McCord, Rudolph Ruzicka and the present Editor. There was general agreement that, in view of the many journals of specific disciplines where the results of specialized research would normally be published, it was desirable to restrict the relatively limited space available in the *Proceedings* to articles of broader interest that might conceivably prove attractive to Fellows in various classes, and to general readers outside the Academy.

The Committee wished to abandon the practice of issuing the *Proceedings* in parts, some of which were available only on specific request, and to issue instead larger numbers of attractive typographical design that would be sent automatically to all members of the Academy. The necessary changes in the Statutes to accomplish this purpose were adopted by the Academy at the November meeting, and the Council authorized the use of *Dædalus* as an added title in conjunction with the *Proceedings*. As the Committee wished to have all matters of permanent record printed in *Dædalus*, and to restrict the use of the *Bulletin* to announcements and matters of ephemeral interest, a smaller simplified format of the *Bulletin*, designed by Rudolph Ruzicka, was introduced, beginning with vol. 8, no. 1, in October 1954.

The first issue of *Dædalus*, dated May 1954, which is now in press will soon be distributed. Its pleasing design is due to Mr. Ruzicka's

skill. In its experimental stages *Dædalus* will appear at irregular intervals, as funds and contributions permit, with not less than two numbers in any calendar year. Eventually if the new periodical lives up to the Committee's expectations, we hope that regular quarterly publication may become possible, but the editing of such a journal is more than present Academy funds or the time of a volunteer editor with other things to do will permit. Rather than seek support to build up a new bureaucracy for an untried idea, it has seemed preferable to test the soundness of the plan experimentally within the limits of available time and money and let the future take care of itself.

While the planning for *Dædalus* (which will bear the volume numbers 86 and following of the *Proceedings*) has been going on, two numbers of the old *Proceedings* have been published. These are the so-called "Summer Number" containing records of meetings, 1953-1954 (vol. 83, no. 4), issued in May and Professor P. W. Bridgman's "Effects of Pressure on Binary Alloys, part II" (vol. 83, no. 5), issued in September. Professor F. H. Crawford's "Thermodynamic Relations in n -Variable Systems in Jacobian Form: part II, Polyphase Polycomponent Chemical Systems," which is now in page proof, will soon be published as the fifth and final number of volume 83.

To reconcile the Committee's plans for *Dædalus* with its strong desire to continue the publication of Professor Bridgman's studies in high pressures, volume 84 of the *Proceedings* has been reserved for this purpose. "Effects of Pressure on Binary Alloys, parts III and IV" are now in type and will soon be published as vol. 84, no. 1. Volume 85 is reserved for a historical commemoration of the Academy's one hundred and seventy-fifth anniversary. A list of Fellows and Foreign Honorary Members as of 1 January 1955 will be distributed as no. 1 of this volume in the course of May, while a second number containing a complete list from 1780 to 1955 will appear later in the year.

WALTER MUIR WHITEHILL, *Editor*

Report of the Rumford Committee

In a series of meetings held throughout the year and through correspondence, the Committee transacted the following business:

The Committee recommended to the Council that steps be undertaken to permit the Academy to attach a pecuniary award to the customary medals that comprise the Rumford Premium. Count Rum-

ford's original directions with regard to the Premium, transmitted to the Academy in 1796, intended the entire income of his gift to be used in the Premium. Indeed we understand that this has been the established practice with regard to the parallel Rumford Premium established at the same time in the Royal Society of London. In 1832, when the income from the Rumford Fund had grown to the point at which the Academy deemed it too large to be used in this way alone, the Supreme Court of Massachusetts empowered it to award a sum of money not exceeding \$300 in addition to the gold and silver medals. The Committee felt that this sum should now be increased. On vote of the Council a petition has been entered before the Supreme Judicial Court of Massachusetts begging permission to award in addition to the medals such further pecuniary premiums as the Academy deems fit; and requesting also relief from certain restrictions upon the investment of Rumford Fund moneys. The Academy's prayer was heard on April 18 by Supreme Court Justice Counihan, and granted.

The Committee reviewed also its policy with regard to research grants. It was felt that though larger sums of money for research are available than ever before, from government and private sources, there is still an important place for small, relatively unrestricted grants in support of research. To make the availability of such grants under the Rumford Fund more widely known, a statement was published in the *Academy Bulletin* and in *Science* describing the grants and calling for requests to be submitted before February 1. Sixteen requests were received, of which however only six satisfied the condition that they deal with researches on heat and light. These, together with one request received earlier, led to the following recommendations voted by the Committee:

To Dr. George G. Holz of the Department of Zoology, Syracuse University, for the purchase of a spectrophotometer and associated glassware to be used in measuring turbidity of protozoan suspensions and in spectrophotometric chemical analyses: \$500.

To Dr. Donald H. Menzel, Director, Harvard College Observatory, in partial support of an expedition to Ceylon to make detailed spectrographic measurements of the sun's outer atmosphere during the total eclipse of 20 June, 1955: \$1,500.

To Professor Jesse L. Greenstein, California Institute of Technology, for computational aid in analyzing the spectrum of a new type of red giant star, which seems to possess an unusual amount of heavy elements including the unstable element, technetium: \$1,000.

To Professor Ralph G. Steinhardt, Virginia Polytechnic Institute, in partial support of an investigation of the variation of x-ray intensity with voltage with targets composed of pure elements and mixtures of elements: \$750.

The Committee voted to recommend that the Rumford Premium for 1955 be awarded to Professor James Franck, of the University of Chicago, for his fundamental researches in photosynthesis. Professor Franck was formerly Professor of Physics and Director of the Physical Institute in Goettingen, Germany. In 1925 he shared the Nobel Prize in Physics with Gustav Hertz. Professor Franck left Germany in 1933 to begin in this country a new scientific career in the field of photosynthesis, first at Johns Hopkins University, and later at the University of Chicago, where he has been Professor of Physical Chemistry since 1938. Since Count Rumford had stipulated that the award be made for discoveries made and published upon the American continent, it was specifically for his work on photosynthesis that Professor Franck was voted the Rumford Premium. This was awarded at the meeting of the Academy on 9 March 1955.

By mail vote the Rumford Committee voted a grant of \$200 requested by Mr. William Jackson of the Harvard University Library to help pay the cost of publication of an article written by Professor Sanford Brown of the Massachusetts Institute of Technology, to be published in the Harvard Library Bulletin. The article is concerned with a collection of drawings made by Count Rumford recently acquired by Harvard, involving Rumford's inventions of the coffee pot, the hearth, and the cookstove.

GEORGE WALD, *Chairman*

Report of the Cyrus M. Warren Committee

The Committee has reviewed its operations and concluded that it might be more effective if special situations were found where the funds would be particularly useful in promoting chemical research. As a result of this investigation, the Committee is recommending support of research in the smaller liberal arts colleges in order to aid in the development of secondary-school teachers. As an initial experiment the Committee recommended two grants of \$500 each to men in two New England schools, as follows:

To Mr. Frank Vertuli of the University of Vermont for study on the oxidation of aryl benzyhydril sulfides, \$500.

To Dr. Gordon L. Hiebert of Bowdoin College for a study of crystalline solutions and the structure of hydrogen halides, \$500.

These grants were approved by the Council at its meeting on 11 May 1955.

E. R. GILLILAND, *Chairman*

5 October 1955 — Stated Meeting

The One Thousand Three Hundred and Eighty-Fourth Meeting of the Academy convened in the Morse Auditorium, Boston Museum of Science, Science Park, Boston, on 5 October 1955, and was called to order by the President at 8:27 P.M.

There were present 60 Fellows and 44 guests.

The records of the Meeting of 11 May were approved.

The Secretary reported that the Council had approved ten grants-in-aid from the Permanent Science Fund totaling \$10,251 and one grant of \$225 from the American Association for the Advancement of Science, Academy Research Grants in New England.

The amendments to the Statutes as proposed at the 11 May meeting and as published in the October issue of the *Bulletin* were adopted without opposition.

Recently elected Fellows were introduced as follows: Henry Knowles Beecher (II:5), David Farquhar Cavers (III:4), Hilda Geiringer (I:1), Robert Clark Jones (I:2), Lockhart Burgess Rogers (I:3), Walter Rosenblith (I:6).

On behalf of the Fellows, President Burchard presented to Mr. Horace S. Ford a silver tray in appreciation of his outstanding accomplishments for the Academy during his seventeen years as Treasurer. The tray was engraved, in a design by Mr. Ruzicka (IV:4), which read:

HORATIO SAYFORD FORD
QUI NUMQUAM CUR NON
SED SEMPER QUOMODO
PROPOSITA EFFICI POSSENT
CONFIDENTER CONSULUIT

D. D. D.

ACADEMIA ARTIUM SCIENTIARUMQUE
AMERICANA
MENS. OCT. MCMLV

The winners of the Academy's Francis Amory Prizes for the septennium ending 10 November 1954, were presented to the Presi-

dent and Fellows by Mr. Edwin B. Wilson, Chairman of the Amory Prize Committee; and prizes of \$3,500 each were awarded by President Burchard.

Frederick E. B. Foley, Lowry Medical Arts Building, St. Paul, Minnesota

Choh Hao Li, University of California, Berkeley, California

Thaddeus R. R. Mann, Moltano Institute, University of Cambridge, Cambridge, England

Terence J. Millin, The Queen's Gate Clinic, London, England

Warren O. Nelson, State University of Iowa, College of Medicine, Iowa City, Iowa

Frederick J. Wallace, American Cystoscope Makers, Inc., New York, N. Y.

Lawson Wilkins, Johns Hopkins University, Baltimore, Maryland

The following Communication was presented:

Terence J. Millin: *Man, Beast and Field*

The meeting was dissolved at 10:20 P.M.

9 November 1955 — Stated Meeting

The One Thousand Three Hundred and Eighty-Fifth Meeting of the Academy convened in the Morse Auditorium, Boston Museum of Science, Science Park, Boston, on 9 November 1955, and was called to order by the Vice-President for Class I, Edward L. Bowles, at 8:30 P.M.

There were present 83 Fellows and 74 guests.

The records of the Meeting of 5 October were read and approved.

The Secretary reported that the Council this afternoon had voted to send the President to the hearings of the Senate Judiciary Subcommittee on Immigration and Naturalization.

The Secretary reported that the Council also named Mr. Burchard the Academy's delegate to the American Council of Learned Societies for a term, beginning 1 January 1956 and ending 31 December 1959.

Recently elected Fellows were introduced as follows: James M. Austin (I:5), Joseph Kaye (I:6), Benjamin Rowland, Jr. (IV:3), Richard S. Perkin (III:5), Oscar E. Schotté (II:3).

The following communication was presented:

Walter G. Whitman: *Atomic Energy Conference in Geneva.*

The meeting was dissolved at 9:40 P.M.

14 December 1955 — Stated Meeting

The One Thousand Three Hundred and Eighty-Sixth Meeting of the Academy convened in 112 Aldrich Hall, Harvard Business School, Boston, on 14 December 1955, and was called to order by the President at 8:25 P.M.

There were present sixty-five Fellows.

The records of the Meeting of 9 November were read and approved.

President Burchard reported on his testifying on 1 December before the United States Senate Judiciary Subcommittee on Immigration and Citizenship Laws, in accordance with the Council's vote of 9 November to represent the Academy's concern that, for the well being of the arts and sciences in the United States, the law should reduce to a minimum the restrictions on visits of foreign scholars.

The Secretary reported on the following actions of the Council this afternoon: (1) The Committee on International Relations was extended for another year and the President authorized to appoint nine members. (2) John R. Pappenheimer (II:4) was elected to fill the unexpired term on the Rumford Committee left vacant by the death of William J. Crozier. (3) \$13,180.71 was transferred to the principal of the Rumford Fund, bringing it to a total of \$100,000. (4) It was voted to appropriate from the Publication Exchange Fund \$3,784 for the use of the Publication Committee, and to approve \$3,364.75 payment for publications from the Rumford Fund and an estimated \$800 from the Amory Fund to cover the cost of publishing the Amory Prize Lecture of 1955. (5) To make it possible for the Academy to retain on Standing Committees members whose services are unusual or unique and yet to keep the general intent of the provisions, adopted on 11 October 1950, to limit the terms of Standing Committee members to single terms of two or three years, it is proposed to make the following change in the Statutes, Chapter XI, Article 1, Paragraph 1: Delete the last sentence, which now reads: "A Fellow shall not be eligible for election for two successive terms", and substitute for it: "A Fellow may not be nominated for successive terms without the specific consent of the Council"; this amendment is to be presented for final action at the Academy meeting on 11 January 1956. (6) Mr. Shapley, Chairman of the Committee on Permanent Quarters, had reported on the activities of that Committee and recommended the opinion of Fellows concerning our

housing needs be sounded out in meeting. (7) In response to an inquiry it was ruled that Academy letterheads should be used, as in the past, only for Academy business. (8) It was ruled that any activities on behalf of the Academy seeking to influence legislation or political campaigns should have the approval of the Council.

Recently elected Fellows were introduced as follows: Paul Alfred Weiss, elected in 1954 to Class II, Section 3; and Dana Lyda Farnsworth, elected in 1955 to Class II, Section 5.

The remainder of the meeting was given over to a general discussion of Academy functions and the policies recently developed by the Council and certain committees concerned with permanent quarters, publications, financing, and public activities.

The meeting was dissolved at 10:30 P.M.

Documents

The following letters from the Academy's files (LETTERS, I, 1780-91, pages 57-58) were inspired by the publication of the first volume of the Academy's MEMOIRS, which John Adams, then Minister to the Court of St. James, sent to John Singleton Copley. John Adams's blithe assumption that faults in perspective are easily corrected suggests that he had never tried that particular art.

I

DEAR SIR

I thank you for the loan of the Memoirs of the American Academy of Arts and Sciences, they have afforded me much entertainment particularly those written by Governor Bowdoin on the structure of the Heavens, and on Light; I feel myself happy that my Countrymen are inspired with a thirst after knowledge, and to see them emulating the Nations of Europe in the cultivation of the Arts and Sciences.

As you have done me the honor to desire my opinion of the plates in this work, I will give it to you without reserve; I think them well engraved, much better than I should have expected, as there was no person that knew much of that Art, in the State of Massachusetts when I left it; but there is a total want of the knowledge of Perspective in every part of them; It is by this art that all objects are truly represented just as they appear to the Eye be they ever so complex, and none of the Imitative Arts are capable of perfection but this, because it is the only one that is wholly within the sphere of Mathematical Science.

All objects diminish as they recede from the Eye and finally lose themselves in a point in the Horizon, called the point of sight; this point is always opposite to the spectator and on a level with his Eye; but as example is always better than precept, I herewith send you a drawing of a pavement with eight square pillars set in two rows and

at equal distances from each other, with the process of drawing them explained by the dotted lines.

I am

Sir

Your Most Obt

Humble Serv.

JOHN SINGLETON COPLEY

George Street
Hanover Square
Oct 1786

} His Excellency John Adams

II

London October 15, 1786

SIR

I do myself the Honour to inclose to your excellency as President of the Academy of Arts and Sciences a Letter and a Sketch from our ingenious Countryman Mr. Copley.

The Artists who engraved the Plates for the Academy, he thinks have failed in Perspective a fault that I suppose is easily corrected.

With great Respect I have the Honour
to be, your Excellencys most obedient
& humble servant

JOHN ADAMS

Governor Bowdoin

